8-2011

Exploring the Effectiveness of Environmentally Sustainable Practices in Municipal Government: A Case Study of the City of Knoxville's Department of Parks and Recreation

Anthony Michael Brown
University of Tennessee - Knoxville, abrow109@utk.edu

To the Graduate Council:

I am submitting herewith a thesis written by Anthony Michael Brown entitled "Exploring the Effectiveness of Environmentally Sustainable Practices in Municipal Government: A Case Study of the City of Knoxville's Department of Parks and Recreation." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Recreation and Sport Management.

Steven N. Waller, Major Professor

We have read this thesis and recommend its acceptance:

Sylvia Trendafilova, Angela Wozencroft

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

Exploring the Effectiveness of Environmentally Sustainable Practices in Municipal Government: A Case Study of the City of Knoxville's Department of Parks and Recreation

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

Anthony Michael Brown

August 2011

ACKNOWLEDGEMENTS

I would like to personally thank Dr. Steven Waller for operating as my compass throughout this process, continually pointing me in the right direction. I would also like to thank Dr. Sylvia Trendafilova for working as my mentor in environmental research and assisting myself in this endeavor. Thank you to Dr. Angela Wozencroft for helping me visualize this research from a different perspective. I want to state that the City of Knoxville was very helpful in this study and made information retrieval very easy. Ameresco has also been a very helpful company in allowing me access to their corporate information to help analyze the environmental sustainable changes made with the City of Knoxville. I want to thank my grandmother in law for giving me the means and verbal support to pursue this degree. I most of all want to thank my wife for helping support me in every way imaginable through this chapter of my life and allowing me to realize my dreams.

Abstract

Sustainability practices produce programs and services that meet current needs while preserving the environment and natural resources for the future. City parks and recreation departments are facing budget shortfalls and governments are now embracing sustainability practices to create financial savings.

The purpose of this single case study was twofold: (1) to examine the effectiveness of one city department's strategies in outsourcing its environmental sustainability program through a performance contract with *Ameresco*; and (2) to examine the perceptions of key department employees about the effectiveness of the sustainability initiative. A snowball sample of 14 employees, stratified by employee class was drawn from the City of Knoxville, Tennessee's parks and recreation department. Qualitative data generated from semi-structured interviews was coded and thematized to analyze the perceptions of the employees included in the sample about the sustainability practices. Financial archival data from utility bills (N = 96) were analyzed over the implementation phase of the contract to determine if cost savings were realized.

Key findings of the study included: (1) financial savings were realized across key operating areas as a result of the contract with *Ameresco*; (2) employees identified positive feelings towards investment in environmental initiatives; (3) sustainability can be obtained through the implementation of an environmental sustainability performance contract; and (4) sustainable practices can further increase efficiency of facilities operation. The results of this study may be generalized to cities of similar size and governmental structure.

Keywords: Environmental sustainability, efficiency, financial savings, public administration

Table of Contents

CHAPTER ONE

Introduction

Currently the United States (US) economy is in dire straits and financial and monetary policies changes are needed to generate a recovery in the economy (Elmendorf, 2009). The housing market has collapsed and the financial banking system has been in trouble (Kahn, 2009). There have been large budget cuts and financial budget gaps that make the Grand Canyon look like a crack in the sidewalk. In the year 2009 there were 38 states facing budget gaps (Sherman, 2008). The economy is still in a weakened state and our prices to operate are continually increasing (HRG, 2007). Cutting costs will be essential to survival and operating each public organization as a business to generate profits will be the key to guaranteeing longevity and high quality of service.

Consumers are putting social pressure on businesses to act more environmentally responsible (Golicic, Boerstler, & Ellram, 2010). Businesses play a more active role in society than just being a producer of a good or service. Consumers perceive businesses as living entities that either support or oppose their lifestyle choices. Consumers are demanding that businesses operate in more socially acceptable ways that support their own beliefs, whether it is through improvements in infrastructure to produce goods and services through environmentally sustainable practices or the role a company plays in their communities (Horne, 2009).

Consumers are not the only ones applying pressure on businesses. In Sweden, consumers have been demanding more from producers in terms of environmental sustainability and responsibility (Kåberger, 2003). The Swedish government has implemented a policy that makes

producers of energy label their source of energy whether it is hydropower, nuclear, coal, etc. The consumers are allowed to decide upon their supplier based on these labeling systems (Kåberger, 2003). The World Trade Organization has established higher levels of regulation that increase the expectations of businesses to be become greener and more responsible to its stakeholders (Nordström & Vaughan, 1999). Governments are also applying pressure to businesses through environmental policies and standards (Pitelis, 2007). Businesses are responding to these pressures through the utilization of "going green," which operationalizes environmentally sustainable practices.

For example, environmental practices in Asia have received attention due to promotion of economic growth in that region (Baughn, Bodie, & McIntosh, 2007). Over the past two decades, China alone has reported 10% growth in GDP per year (Wang & Watson, 2010). China is currently facing a limited supply of energy and water, as well as having a heavy reliance on energy produced from coal. Through investments in infrastructure Chinese businesses can give themselves a financial and social advantage (2010). Asia has been growing into an economic powerhouse and green operations have been put on the back burner up until recently. Now businesses in the Asian sector are still in an expansion mode and during this expansion are starting to act more environmentally conscious and publicize it. In Asia, businesses have come to the realization that their industry growth is having negative impacts on their stakeholders, inclusive of the environment and consumers views of the company (Baughn et al., 2007).

Going green is producing sustainable programs and services that reduce energy consumption, reduce waste, utilize more efficient facilities with sustainable materials, and engaging in environmental management services and programs (Cordano, Marshall, &

Silverman, 2010; Jarvi, 1997; McCollum, 2009). Some organizations resist pressure from government to spend money on greener technology especially during these hard economic times (Kahn, 2009). Often smaller firms do not have the knowledge or extra money to invest in greener pursuits. Kahn (2009) feels that the $150 billion greening initiative of president Barrack Obama will both create and eliminate jobs, even though the President feels that this legislation if pushed through will create five million new jobs that will stay in the United States. However, by the government creating environmental barriers for industry it may make those industries look elsewhere to produce their goods and services.

The push to implement environmental sustainability practices is not new to the business world. In fact, in 1908, a national conference on conservation was held at the White House where president Theodore Roosevelt stated, "Our position in the world has been attained by the extent and thoroughness of the control we have achieved over nature; but we are more, and not less, dependent upon what she furnishes than at any previous time of history" (Tapella, 2008, p. 6). This statement was a request for environmental practices and is still applicable in today's economy. The modern role of a local government is being part of a larger economy that is responsible for delivery of goods and services but also focuses on the protection and improvement of society (Jamali & Sidani, 2008). This is a challenge for local governments especially since demand of the local parks systems is increasing. This increase in usage could threaten our natural environments via greater pollution, erosion, and the depletion of our natural resources (Frauman & Norman, 2003). Therefore, users utilizing facilities with infrastructures that are environmentally friendly can lead to cleaner operation facilities and better overall user

satisfaction. Regardless of whether the local government organization partakes in environmentally sustainable practices because of social pressures or making this decision voluntarily, it will be interesting to see if this decision is financially savvy.

Statement of the Problem

City parks organizations once use to operate as solely a public service but now times have changed and parks are faced with tax caps, the current economic downturn, and expectations from tax payers for parks and recreation to provide services in an environmentally friendly manner (Payne, 2008). One of the future trends in recreation is environmentally sustainable practices and these are predicted to play a key pivotal role in the success of local parks and recreation industry (D, 2009). Parks and recreation organizations own and operate commercial buildings and these buildings can have large operating costs. The U.S. Department of Energy (2008) published information regarding energy efficiency trends for commercial buildings. In 2003, there were 4.86 million commercial buildings in the United States. Of those commercial buildings 15% were local government, 5% state, and 3% federal government owned and occupied. In 2005, commercial buildings majority of energy consumption was 27.3% heating, ventilation and air/condition (HVAC), 25.5% electricity, and 6.8% water heating (DOE, 2008). If the costs of electricity, HVAC, and water heating could be cut there is potential for large financial savings realized by local parks and recreation departments.

A change in our operation has come due to a dwindling economy and decreasing financial government support and increasing costs. Traditional funds that paid for park services are diminishing and the number of users is increasing (Barnes & Brayley, 2006). The housing

market has collapsed and the financial banking system has been in trouble(Kahn, 2009). There have been large budget cuts and financial budget gaps that make the Grand Canyon look like a crack in the sidewalk. In the year 2009 there were 38 states facing budget gaps (Sherman, 2008). The economy is still far from getting better and our price to operate continually increases (Survival of the Greenest, 2009). Local governments' deficits are increasing and these organizations are now scaling back expenses to help balance budgets (Elmendorf, 2009).

Cutting costs will be helpful to local governments' survival in the new economic environment. According to U.S. Department of energy, replacing our current magnetic ballasts for lighting with electronic ballasts can recognize savings of energy by up to 30% (DOE, 2008). The real problem here is that parks managers are currently operating a growing business with less income and higher costs. The local parks managers of the 21st century will need to run facilities in a more cost effective way to stave off rising operating costs and the increased demands of the facilities and services.

Purpose Statement

The purpose of this single case study was to determine whether one city department's sustainability practices of investing in energy efficient infrastructure will create the projected financial savings. If the strategy was considered effective, it would then be evaluated to determine the extent of the financial savings compared to the original projected savings. After the efficiency was determined, it was then decided what overarching impact this implementation has and if the desired overall effect has been attained through these measures. The other purpose of this research was to capture and evaluate the recreation department employees' feelings

towards these sustainable changes being made and whether these changes were looked at in a positive manner.

Significance of the Study

The current economic situation has managers facing budget shortfalls and looking to save extra unneeded costs. Environmentally sustainable practices in the areas of HVAC, plumbing, lighting, and water can be utilized to create savings through capital expenditures. The largest problem with tight budgets for managers is trying to allocate money to new environmental capital projects when the current capital is still operational. There are currently small and large capital expenses associated with economic sustainability practices. Purchasing environmentally friendly equipment and supplies can become a costly venture.

In response to the social and economic pressures, the city of Knoxville entered into a performance contract with Ameresco. This contract planned to renew the energy structure that dominated the public organization. Toilets, light systems, irrigation systems, windows, doors, plumbing, and HVAC will all be retrofitted or replaced with more sustainable technology. This technologies purpose was to allow for better performance in lowering carbon footprints, reducing energy costs and operating costs. The implications of this research could show organizations that by investing in energy efficient infrastructure this action could lead to cost savings that give an organization a financial advantage during these tough economic times.

Practical research was needed regarding efficacy and financial efficiency of environmentally sustainable renovations of public recreational organizations through contracted agencies. Efficacy referred to the capacity of the infrastructure improvements to produce the

desired energy and cost savings (Efficacy, n.d.). The financial efficiency in this case referred to comparing the projected savings to the actual savings (Efficiency, n.d.). Effectiveness of the study was determined by monitoring the project to see if the desired effect of energy, water, and financial savings were realized by the department (Effectiveness, n.d.). The city desired to create a sustainable infrastructure that would continually minimize operating costs and maximize energy output. This practical research attempted to make it easier for managers to make the decision to implement sustainable practices within their organizations. As good managers in the field of recreation it must be realized that federal funding is disappearing and variable operating costs are increasing (Arrandale, 2006). In the current economic downturn the public negatively views increases in taxes. The general fund which is supported by taxes is now slowly dwindling. Recently public recreational organizations have been looking at increasing fees, utilizing corporate sponsorships, cutting spending, using contingency funds, or look at other ways to lessen the financial blows. Environmental renovations could be the key to helping organizations survive in this presently weak economy (D, 2009).

CHAPTER TWO

Literature Review

Environmental Sustainability and Sustainability Theory

The concept of sustainability has changed over time. One of the earlier definitions of sustainability was presented by the World Commission on Environment and Development and defined as, "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland & Khalid, 1987, p. 41). More recently as stated by Hassan (2006), sustainability has become, "… the ability to achieve economic prosperity while protecting the natural systems of the planet, and providing a higher quality of life for its people" (Hassan, 2006, p. 223). It was imperative to operationalize the term sustainability. In this single case study, sustainability was the act of investing in upgrades or retrofitting public recreation and leisure buildings and sites with new infrastructure that focuses on conserving energy and water as well as aid in lowering maintenance costs. Some of these infrastructure changes also utilize renewable energy sources. Examples of these sustainable improvements were waterless urinals, energy savings ballasts, light emitting diode lights, weatherization measures, high pressure toilets, light sensors, photovoltaic cells, and centrally controlled HVAC systems. This act of sustainable practices hoped to lead towards financial savings for the department as well as the City of Knoxville

Sustainability theory is the idea of applying sustainable practices to current operations while preserving the environment and natural resources for the future. In this study sustainability was defined as the utilization of energy efficient capital to attain financial savings in operating costs to government owned facilities through the minimal usage of non-renewable

energy sources. Investments in infrastructure such as those wind farms in the United Kingdom have become sustainable and viable energy alternatives to fossil fuels.

A study was conducted in the United Kingdom from 1991 to 2006, where local consumers were asked about their support before and after construction of the Carland Cross wind farm (Eltham, Harrison, & Allen, 2008). A questionnaire of closed and open ended questions was utilized in combination with an interviewer who recorded the comments about the questions to help accurately capture the residents' feelings. In 1991, before the wind farm was built the respondents were skeptical of the new technology and they felt they were not as involved in the planning as they had hoped. Some respondents were completely unaware of any planning for this project. From 1991 to 2006, the research states the respondents were in consistent support of developing improvements in infrastructure towards the end of sustainable practices. It is also important to note that this same population also felt that the aesthetics and function of wind farms were becoming more attractive (Eltham et al., 2008).

Environmental Sustainability and Savings

Different companies have pursued savings using environmentally sustainable practices. Companies like Wal-Mart have chosen green sustainable technology to be able to realize cost savings. The Government Printing Office has also taken the road less traveled and has found savings of operating costs that saves the tax payers money. Whether a company is big or small environmental sustainability efforts can realize real savings.

A study by Matthew Kiernan (2001) produced a simulation incorporating a Morgan Stanley portfolio of S&P 500 companies. In this study it was shown that by participating in environmentally sustainable practices it can push a business to financially outperform its

competitors (Kiernan, 2001). Wal-Mart is a large global competitor and this large entity has picked up on the trend to partake in environmental sustainability practice to help save operating costs.

Environmental sustainability information is being publicized in the realm of business, such as Wal-Mart choosing to embrace this practice. Wal-Mart is one of the largest companies to ever go green (Nandagopal & R.N., 2009). They have seen large cost savings. The company's entire purpose is to operate the company while showing a profit and still be able to pass on some savings to its customers. The plan called for reduction in energy cost usage by 30 percent, a 50 percent cut in its water consumption in the next few years at its facilities and provided incentives to those that utilized energy efficient and renewable energy. Wal-Mart created thirteen value networks focusing on environmentally sustainable initiatives. These value networks consisted of environmental experts, scholars, suppliers, and government officials cited. Actions such as the removal of light bulbs in vending machines in break rooms saved more than one million dollars. In January 2008 Wal-Mart started opening more efficient store fronts that consumed 25 percent less energy than its standard Wal-Mart Supercenter (Nandagopal & R.N., 2009).

Recently, the Government Printing Office (GPO) has instilled environmental sustainability practices into their work environment. The GPO, who prints all federal documents including passports, has changed their facilities roofs, lights, glass, heating and cooling systems with high efficiency sustainable energy products. The GPO saves operation costs and in turn saves the tax payers money. The government entity believes that environmental sustainable

practices are "good business and good government." The organization also performs multiple energy audits on a continuous basis to identify any other possible cost savings strategies. GPO has an employee program that financially rewards the employees for making good environmentally sustainable decisions (2009).

Environmental Sustainability and Sports Facilities

Unfortunately sometimes there are high costs associated with changing out any operational infrastructure. The Meadowlands Stadium for the New York Jets and Giants was positioned to be an environmentally sustainable location. However, even with all the technology and sustainable practices and materials used the stadium missed a Leadership in Energy and Environmental Design (LEED) certification (McGillion, 2009; Muret, 2008).

Meadowlands Stadium in East Rutherford, NJ cost $1.7 billion were 82,500 NFL fans will meet each week (EPA, 2009; McGillion, 2009; Muret, 2008). The stadium signed an agreement with the Environmental Protection Agency in June 2009 and was poised to be the most environmentally friendly stadium in American sports (McGillion, 2009). The agreement included the use of sustainable materials and environmental practices including reusing materials (EPA, 2009). It is also expected that the stadium will incorporate environmentally sustainable practice into its daily operations. The agreement in poised to conserve water by 25% and energy by a 30% reduction in use (EPA, 2009; McGillion, 2009). The water conservation will translate into 11,000,000 gallons of water each year (EPA, 2009). Using artificial turf that does not need

water saves 3,500,000 gallons of water per year (EPA, 2009). Low flush toilets use 1.6 gallons of water instead of 3.5 gallons per flush (EPA, 2009). Low flow shower heads, waterless urinals, sensor and metered faucets are also utilized to conserve water (EPA, 2009). The seating at the stadium is made from recycled materials. At the concession stand fans will received plates, cups, and carriers made from sustainable materials (McGillion, 2009). Alternative renewable energy, new luminaries that are 84% efficient which minimize light spill will be controlled with an automated lighting control system (EPA, 2009). It seems every step possible has been taken by Meadowlands stadium to be sustainable and socially responsible. The open air stadium is a success as being one of the greenest stadiums however it missed its mark by one or two points of being LEED certified (Muret, 2008). LEED requires heavily insulated glass for the suites of the stadium. Unfortunately the joint venture for the stadium chose a less insulated glass which would be less intrusive for the viewers from the suites (Muret, 2008). It should be noted that obtaining Leadership in Energy and Environmental Design (LEED) certification was not the original intent of the Meadowlands stadium (Muret, 2008).

Collegiate Level Sustainability Practice

The recent work of Solmes (2009) discussed the University of South California (USC) and how the university was presented, in 1995, a $34.6 million proposal from an energy investment company. USC was in a position where $200 million of deferred maintenance was in need of attention with three different approaches that were being operationalized (Solmes, 2009). The first approach was to replace equipment as it broke and the second approach was to replace systems slowly on a campus wide basis. The third approach was to attain energy equipment

upgrades based on cost savings. So at that time USC was not using a holistic approach to conquer their deferred maintenance.

The purpose of the proposal was to take a more holistic approach and make upgrades to outdated inefficient equipment and to control the energy costs. The investor was to audit the current operations costs and execute the purchase of upgrading energy supplies and distribution systems. The investor also purposed implementing a real time energy financial accounting system. The system would be able to monitor, control, and report real time data. The investor was expected to align him/herself with USC to accomplish a goal of not increasing energy budget costs over the 1995 energy costs and the company would be guaranteeing performance for 15 years (Solmes, 2009). The investor was expected to purchase, install, and maintain the newer, more efficient equipment and USC would not have to expend any capital in the inception. The investor would earn money back through its performance guarantees while still saving the university money.

The investor had access to resources and financial experience that the university would not be able to obtain otherwise. USC did not want the project debt on their balance sheets so the investor took a tax exempt financing method forming a special purpose non -profit corporation that would hold the project title and supply electrical and energy conservation services to the university (Solmes, 2009). The other option was to use leveraged leasing and use tax benefits associated with ownership and pass those savings on to USC (Solmes, 2009).

USC also looked at using operated budget savings from deferred maintenance and found the cost of retrofitting their lights cost $94,829 with annual savings of $23,948 and this

technology would pay itself off in 3.96 years. A double duct variable-air-volume and fan variable frequency drive cost $81,190 with annual savings of $32,742 with a payback of 2.48 years (Solmes, 2009). A chiller plant needed to be purchased due to environmental and reliability concerns. The new lighting will generate less heat, thus the chiller can be smaller than originally anticipated. The original cost of the larger chiller was to be $210,000 which was brought down to $165,265. The new chiller would only save $11,668 per year and would take 14.15 years to pay off, so it was found that these other shorter projects could pay for longer term projects like the new chiller plant. By combining all of the projects including the controls, monitoring, recommissioning, and technical audit design survey with total payback would only take a total of 7.33 years (Solmes, 2009). Unfortunately this proposal failed since the investor delayed the project and another company took its place. There are sustainability efforts being made at both the professional and collegiate level. It seems as though there is still a disconnect that is occurring between the sports and the recreation industry. This study hopes to bridge this disconnect and allow practitioners in parks and recreation to see how a public facility has operationalized environmentally sustainability practices within the parks and recreation industry.

Fiscal Sustainability

Fiscal sustainability is the concept of being able to meet the financial demands of today without compromising the long term demands of the future (Chapman, 2008). This means that an entity must be able to survive long term without running a long term net deficit. This concept is imperative for public and private sector. Chapman (2008) suggests that state and local governments should be allowed to utilize different public policies to encourage necessary growth

to support the "well being of future generations" (p. S115). A multitude of pressures can influence the governments' fiscal sustainability. Cyclical changes such as the fluctuations in the stock market and housing market. Increases in housing sales and construction lead to greater sales tax and property base tax (Chapman, 2008). Another influence is structural pressures including suburbanization and demographic changes. Suburbanization changes can lead to increased need in infrastructure changes that have the potential to exceed economic efficiency standards (Chapman, 2008). Chapman also believes that intergovernmental pressure exists in the forms of federal government mandates for state and local government.

Governmental policy may help organizations attain fiscal sustainability by establishing environmental sustainable benchmarks. On January 24, 2007, a new standard for energy efficiency and sustainability standards on all federal buildings was signed into being by President George Bush (2007). This benchmark requires operational changes and equipment investment. Another requirement is that 15% of each agency's existing buildings are required to meet the 2006 sustainability principles by the year 2016 ("Bush Sustainability Directive Sets Benchmarks for Facilities," 2007).

According to Chapman, fiscal sustainability relies on the interconnected network of infrastructure, for example, water lines, sewers, electrical, and public buildings (Chapman, 2008, p. S123). Chapman also suggests that expenditure patterns could also lead to fiscal sustainability. From that suggestion it may be assumed that investment in programs and sustainable infrastructure may lead towards the mission of fiscal sustainability. Without changes occurring fiscal sustainability will disappear (Chapman, 2008). "State and local governments

must make difficult financial restructuring choices" (Chapman, 2008, p. S124). State and local governments need tools to help them stabilize their finances and sometimes risky investments with uncertain futures need to be sought to generate better returns (Chapman, 2008).

Baglioni and Cherubine (1993) performed a study in Italy to determine if the current Italian government's fiscal policies violate the intertemporal budget constraints. Italy had been running a public deficit, around 10% of their Gross National Product (Baglioni & Cherubini, 1993). Intertemporal budget constraint suggests that fiscal policy is sustainable if "…the net revenues generated are able to repay accumulated debt and interest expenses." (Baglioni & Cherubini, 1993, p. 275). If a government entity is running a deficit now, later it should be able to run a surplus in the future to ensure repayment of its debts. Empirical tests in this study to evaluate the data to determine if fiscal policy was in violation.

Empirical evidence showed that the current fiscal policy adopted was not sustainable long term. This is due to the current policy violating the present value borrowing constraint. It was also found that efforts to increase revenues were associated with increases in expenses (Baglioni & Cherubini, 1993). This is important to note, because revenues are not the long term solution, it should be noted that another potential solution here is for investment in public sustainable infrastructure.

State and Local "Greening" Efforts

The American Society of Civil Engineers (2009) rated the condition of America's parks as "mediocre" and the majority of the America's infrastructure as "poor", thus creating some

urgency to repair this broken infrastructure. The financial need to improve the overall infrastructure is estimated at $2.2 trillion with $85 billion in parks alone (American Society of Civil Engineers, 2009, p. 117). There is always the question of whether or not making "greening" efforts will be economically feasible in this era of financial crisis. These environmental sustainability efforts have up-front costs that may be hard to argue for when the realized savings may be long term and not immediate. A wave of cities from Seattle to New York City have embraced new environmental sustainability practices in an attempt to help create savings that will hopefully lead to the end result of fiscal sustainability. Financial stresses have causes legislators to explore energy conservation and green building standards (State and Local Governments Tap into the Green Building Trend, 2006). "Energy represents the single largest controllable operating expenses for office buildings(State and Local Governments Tap into the Green Building Trend, 2006, p. 16). The idea of "green" buildings means that the buildings are produced with their life-cycle in mind. Green building includes: energy efficiency, renewable energy, water stewardship, environmentally preferable building materials, waste reduction, indoor environment, and smart growth sustainable development (State and Local Governments Tap into the Green Building Trend, 2006).

In 2000, Seattle adopted a sustainable building policy (State and Local Governments Tap into the Green Building Trend, 2006). The policy states that any newly built or renovated city project with more than 5,000 square feet of occupied space must acquire a Silver rating from the U.S. Building Council's Leadership in Energy and Environmental design (LEED) which is a "green" building rating system (State and Local Governments Tap into the Green Building

Trend, 2006, p. 18). In Albuquerque, New Mexico the government followed the footstep of Seattle by implementing a mandate for all projects above 5,000 square feet. Existing buildings (EB) will follow LEED EB standards, commercial interiors (CI) must meet LEED CI, and the core and shell (CS) must abide by LEED CS, while new construction (NC) will be mandated to meet the LEED NC standards (State and Local Governments Tap into the Green Building Trend, 2006). Houston, Texas has also followed suit with similar policies.

Before Janet Napolitano was appointed the United States Secretary of Homeland Security she was the Governor of Arizona. During that time she signed an executive order requiring all state funded buildings to achieve LEED silver certification and all new construction was mandated to utilize renewable energy. Under the previous Governor of Arizona, Mike Huckabee, created a legislative task force on sustainable building design and practices to review and advise on issues. So it was apparent that governmental units were making attempts at "greening" their organizations (State and Local Governments Tap into the Green Building Trend, 2006).

Another example of this embracement of "greening" was found in San Francisco, California, where the Public Utilities Commission was in need of a new building. The commission hired KMD architects to build a new $178 million, 254,000 square foot, 12 story headquarters that embraces water recycling, energy efficiency, and a reduced carbon footprint (San Francisco Building Raises Bar on Sustainability, 2007). The sustainable infrastructure will be accomplished through solar panels, wind turbines, faucet sensors, waterless urinals, and on-demand water heaters. This new infrastructure is intended to reduce use of water to 5 gallons per

occupant per day compared to the old average of a much higher 25 gallons per day (San Francisco Building Raises Bar on Sustainability, 2007). A greywater system is also implemented to reuse sink and faucet water. The water is collected and filtered in an underground container and then redistributed to cooling systems or to toilets for reuse. The building is anticipated to exceed LEED Platinum certification.

In a few other cases, focus was not just placed on government funded facilities. Gainesville, Florida issued regulations encompassing government funded facilities as well as the private sector. Gainesville offered fast track building permit incentives and a 50% reduction in cost of building permit fees for private contractors who utilize the LEED Program for construction (State and Local Governments Tap into the Green Building Trend, 2006). In the state of Maryland, tax credits are offered for development of brownfields as well as tax credits for businesses that were constructing or rehabilitating buildings greater than 20,000 square feet and used for non-residential purposes while incorporating energy savings and minimizing any environmental impacts (State and Local Governments Tap into the Green Building Trend, 2006).

San Francisco was not the only city utilizing greywater systems. New York City department of parks and recreation (NYCDPR) is setting the new benchmark for the industry(Benepe, 2008; Waller, 2009). Over the past twenty years, the parks and recreation department has acquired a fleet of 2,500 vehicles consisting of solar powered utility vehicles, electric golf carts, electrics sweepers, electric sweepers, hybrids, trucks operated on soybean biofuel, and compressed natural gas (CNG) vans (Waller, 2009). The biofuel vehicles operate on B20 which is a fuel that is 20% biofuel mixed with diesel and the department has realized a

quick return on their investment (Benepe, 2008). The fleet is yearly showcased to the public and has fostered relationships with organizations like BP and Toyota. It is anticipated that by the year 2030, a 30% reduction in their carbon footprint from their current levels will be realized (Benepe, 2008). NYCDPR has also utilized greywater systems for irrigation purposes saving the city thousands of gallons of water. Lighting fixtures in community centers, aquatic centers, basketball courts, and other parks and recreation facilities have been replaced with fluorescent bulbs in attempts to lower utility costs (Benepe, 2008; Waller, 2009). It is also anticipated that even with the upfront costs of these environmental measures that there will still be a zero net cost to the city in the long run due to savings from the energy efficiency implementations (Benepe, 2008).

City of Knoxville, Tennessee

This study will encompass sustainability theory to look at the city of Knoxville parks and recreation department. According to the Center for Business and Economic Research at the University of Tennessee, population estimates for the metropolitan area of Knoxville in 2009 were 699,247 (CBER, 2000). The US Census Bureau estimated that in 2006, the city population would have been around 182,337 people (US, 2010). The city of Knoxville has entered into a performance contract with Ameresco. The entire project including capital costs and maintenance is funded by the savings that are produced (Ameresco, 2010). In 2009, Ameresco had already performed an investment grade audit and developed a plan. At that time, the city had 81 parks, three golf courses, 13 gymnasiums for sports activity and one additional that had been converted for other use, three indoor and two outdoor pools, and 71 ballparks. The utilities monitored were

electric, natural gas, water, and wastewater. The plan consisted of first performing an audit of all meters that contributed to the utility bills for all parks and recreation infrastructure. This audit consisted of parks department personnel, Ameresco personnel, and the utility company walking and confirming each unit for each department site. This process led to the elimination of certain meters that were no longer needed nor used by the facility. The second portion of the plan consisted of retrofitting and upgrading lights, upgrades to allow for better water conservation, adding energy controls to facilities like "HVAC systems, programmable thermostats, and vending machines" (Weil, 2009, p. 4). Inefficient capital such as boilers and pumps are to be replaced. Windows and doors are going to be retrofitted with higher efficiency products. Parks and golf courses with higher water needs were identified and retention ponds were built. These ponds were used to water the grounds and decrease the use of water from the utility company. The current practices for water treatment at city pools were analyzed and improved. Solar water heaters and power were to be utilized as alternative energy sources. The energy savings agreement was expected to save the city between 12-25% in utility costs. Construction was poised to begin in August 2009.

The sustainable infrastructure was scheduled to be implemented in three phases. During the first phase of renovations, ballasts and bulbs were replaced to support T3 fluorescent bulbs. Light sensors were installed in gymnasiums, hallways, and bathrooms with automatic shut off at ten minute intervals if no movement is detected. During the second major renovation phase, parks and recreation department buildings were retrofitted with improvements in sewer, low flow faucets, and high pressure low flow toilets. The last major installment has not occurred as of yet

but will encompass the installation of remote programmable thermostats. These thermostats are often referred to as electronic management systems (EMS). Currently in older department facilities, thermostats were placed in areas where staff and/or patrons can access the panels and adjust temperature. An attempt was made to control access to the panels by installing lock boxes over the controls. This investment helps control patron use however this did not help control staff. The new thermostats will allow central control of all facilities temperature through a computer program and allow for better energy use. This system is expected to help regulate temperatures in all buildings and restrict access.

New facilities being built are expected to focus on LEED-silver certification which if obtained will utilize environmentally sustainable materials. The LEED silver certification is expected to improve energy performance by forty-two percent and water consumption by thirty percent (Weil, 2009). The city had plans in place to ensure that their efforts for environmental sustainability was in clear public view (Weil, 2009). Being able to utilize basic data to monitor financial savings and to interview employees of all levels to obtain their perception and feelings towards this environmental movement should help make other parks and recreation departments aware of potential financial savings and possible pitfalls.

Summary

Sustainable practices are playing a larger role in our tight budgeted weak economy. Whether sustainability was chosen freely or whether these sustainable practices were chosen due to a push from the government, it is clear that greening efforts will be here to stay. Sustainable practices have been implemented in businesses, professional sports programs, colleges, city governments, and recreation departments. The previous literature has shown that proper investment in energy efficient can create operational financial savings.

Research Questions

The specific research questions used to guide the present study include:

1 Did Ameresco meet or exceed the proposed environmental improvements met or exceeded the established objectives defined in the contract?

2 Were cost savings achieved as a part of the city's sustainability efforts?

3 What are employees' perceptions about environmentally sustainable practices in city government?

Operational Definitions

For the purposes of this study, the following will be defined.

1 Brownfields- real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties protects the environment, reduces blight, and takes development pressures off greenspaces and working lands (Environmental Protection Agency, 2011).

2 Effectiveness- the study will be determined by monitoring the project to see if the desired effect of energy, water, and financial savings were realized by the department (Effectiveness, n.d.).

3 Efficacy- refers to the capacity of the infrastructure improvements to produce the desired energy and cost savings (Efficacy, n.d.).

4 Efficiency- the financial efficiency in this case refers to comparing the projected savings to the actual savings (Efficiency, n.d.).

5 LEED- U.S. Building Council's Leadership in Energy and Environmental design. This is a "green" building rating system.

6 Sustainability Practice- practices that produce programs and services that meet current needs while preserving the environment and natural resources for the future.

7 Going green- is the production of sustainable programs and services that reduce energy consumption, reduce waste, utilize more efficient facilities with sustainable materials, and engaging in environmental management services and programs (Cordano, et al., 2010; Jarvi, 1997; McCollum, 2009).

8 HVAC- acronym for heating, ventilation, and air conditioning.

9 Annualize- refers to the data in 2011. The data from fiscal year 2011 consisted of six months and multiplied by two to gain an estimate of utility cost for the entire fiscal year.

CHAPTER THREE

Methodology and Design

This research consisted of both qualitative and quantitative data. The qualitative data was generated from semi-structured interviews. The qualitative data represented how the employees interpret feelings of individuals working within the boundaries of this case study (Merriam, 2009). This qualitative data aim was to improve practices as well as increase the knowledge base of this phenomenon (Merriam, 2009). To ensure internal validity respondent validation was performed (Merriam, 2009). Triangulation was used during the study and three points of reference were established. These three points consisted of: definition of terms, the archival data, as well as what was viewed during the interview process. These reference points were all compared to help analyze the data. The quantitative data was collected from the city department's aggregated data that consisted of all utilities such as electric, water and sewer costs. The quantitative data was used to determine the dollar amount of money saved or expended, the percentage change, and used in the identification of the facilities most affected by participating in this program.

The overall method was a case study of singularity which was a way of looking through a lens at a small sample and being able to generate data that may be generalized to other cases rather than hypothesis testing (Bassey, 1999; Merriam, 2009; Simons, 1996). However, according to Stake, a case study could be defined as an intrinsic unit of study that has been chosen to gain a better understanding of that particular case (Stake, 1995, p. 77). The goal here was to obtain a better understanding of investment in infrastructure within the realm of public recreation and leisure throughout the implementation stages. This method allowed an "…in-

depth examination of a single instance…which can yield explanatory insights" (Babbie, 2007, p. 309).

The vast amount of data collected in case studies from a natural environment create depth which in turn may help evaluate and create different interpretations of the subject studied (Bassey, 1999). Case studies have been utilized to create the foundation for general theories, however, the focus of this study was not develop a theory but the sole purpose was to analyze a specific happening and to contribute to the knowledge base of sport, parks and recreation professionals (Babbie, 2007; Merriam, 2009). Stake also felt that the method of case study research can be used for "tacit understanding in generalizing from the case" (Simons, 1996). A common problem associated with single case studies has been the subject of generalization. Viewing a specific case and making the attempt to generalize is exactly the paradox that researchers need because this allows practitioners and fellow researchers the opportunity to view both a specific instance and compare that to a universal understanding and then make the attempt to tie those two worlds of thought together (Simons, 1996). This microscopic viewing of a specific case can realize thorough and unique understanding. Another researcher of case studies named Yin, believes that this method has provided more insight to the "how" and "why" of an organization (Yin, 2009, p. 13). Yin also believed that this method does not separate the phenomenon's variables from the context in which they exist (Yin, 2009, p. 18).

Site

The parks and recreation department sites was inclusive of golf courses, parks, swimming pools, gymnasiums, tennis courts, ball fields, greenways, shelters, weight training facilities in this southeastern city. All recreation facilities from offices to gyms have been

retrofitted with some new lighting systems. In some facilities, it was deemed inefficient to invest in new lighting in all rooms. It was also not efficient to invest in new lighting for the athletic fields. Some facilities such as the gyms had special light switches installed that controlled the new lights with sensors built into the lighting fixtures. The purpose was to sense activity and only allowed lights to be on during active use of the facility. Certain areas such as passage quarters, due to fire code, still have lights with no sensors that are controlled with switches. The lights that were replaced are utilizing the T15 or T3 bulbs. Incandescent bulbs with diffusers were used because of their high foot candle output and this allows the department to use less light fixtures to provide the same or better amount of light to each room. Where the sensors were installed, the department was rid the issue of staff or users leaving the lights on and this helped to gain control of costs. Another feature added was the low flow high pressure toilets which will conserve water each flush. The buildings faucets were retrofitted with low flow faucets that also contributed to water conservation. During phase three, all buildings in the recreation department will have a new thermostat system installed that can be controlled by a remote usually operated by a manager of the department. This system will be monitored through a computer program which interfaces with the thermostats of all department buildings.

Sample

The snowball stratified sample was generated from the city of Knoxville, Tennessee city parks and recreation department's employees. A sample size of 12-20 males and females above the age of 18 and designated as part time or full time employees were to be identified using the organization chart and contact lists generated by the parks and recreation department. Please refer to Figure 1 for the department organizational chart. Contracted employees were not

allowed to participate because contracted labor may not be able to identify with the city departments' culture nor be emotionally invested in the company. The pilot test was anticipated to take approximately seven calendar days. The pilot test was to be run to test for validity. Once it was to be completed, the actual open ended interviews for the study was attempted to be conducted over a period of fourteen calendar days. Due to time constraints of employees the interview process took twenty-one days. The purpose of the interview was to identify how employees' felt towards the environmental sustainability practices that have been implemented as well as those that will take place in the future in accordance with the performance contract. The open ended interviews allowed each employee to tell a story and helped to identify how the organization has been affected by the changes in practice (Merriam, 2009). It was also important to understand whether the changes in the organization have been embraced.

Instrumentation

The original semi-structured questions have been borrowed, with permission, from another research project (Babiak & Trendafilova, 2010). The questions were modified to specifically reflect the environmental sustainability theory and the effects on the organization employees' feelings toward the project. However, since the questions were modified, pilot testing was preferred. A homogenous group was identified and this group was to be selected for pilot testing of the interview questions. Testing was expected to consist of a sample size of eight individuals and take approximately seven calendar days. Upon completion of the pilot test, questions were to be modified as needed. The homogenous group identified was Chattanooga parks and recreation department due to similar city and department size. However, due to unforeseen circumstances, this did not occur. The semi-structured questions were thoroughly

reviewed by committee members to ensure that the questions were relevant and would acquire the depth in data needed to answer the research questions. The original interview gained internal validity by using several questions to discover the same concept. Validity was established for the new modified question by consultation with experts in the field.

The interview questions consisted of three different areas. The first section inquired about demographics such as age, position title, and full or part time. The second section inquired about how employees felt about the adoption of environmentally sustainability practices with questions such as 1) do you feel your role in the department has an effect on the outcome of the initiative and 2) what do you feel is your department's responsibility to the environment?, will be asked. The third section covered environmentally sustainability program compliance within their organization such as 1) to what extent has the director of the department been a factor in your organization's environmental focus and 2) what kind of management systems have been implemented to support and ensure that these environmental sustainability programs are delivered effectively?. Please refer to Appendix B.

Qualitative Data

Qualitative data collection procedure.

The procedure of the interview process took place accordingly. Once the sample was identified, each employee was contacted while on the job site via phone or email. If the individual was unavailable a voice mail message was left for the employee requesting a call back. On the second day, another call was placed to the potential participant and if no answer was obtained then another employee was randomly selected from a department generated list of upper and middle-administrators within the parks and recreation department. If an email was

sent, the potential candidate was given a letter informing them of the purpose of the study. A copy of the informed consent was also distributed that explained the purpose of the study. Once contact was made to an employee, he or she was informed about the interview, any questions were responded to, and asked the employee was asked if they were willing to participate.

Upon agreement, if the participant had not been sent an email and was contacted via phone the participant was then sent a cover letter and informed consent form. The participant was then asked to schedule a date and time to interview at their earliest convenience. A public place for the interview was determined by the participant and the researcher. The researcher drove to the public location to perform the face-to-face interview which was expected to take about thirty minutes and ended up taking a maximum of thirty minutes. It was expected to take 14 calendar days to complete the interview process but again due to time constraint of employees, the process took a total of 21 days. Each participant was given a pseudonym and referred to as an alphabetical character therefore eliminating the use of names. Each participant was giving a working definition of "going green" and "sustainable practices" to help delineate the terms and avoid confusion. The participant was asked for permission to use an audio recorder. If permission was obtained then the interview data was documented on site via digital audio recorder. The participant was reaffirmed that everything stated during the interview would remain completely anonymous. The interview was transcribed verbatim. Upon finishing the interview the participant was asked to refer an employee of the department that meets the criteria set forth in this study.

Qualitative data analysis procedure.

The qualitative sample of audio recordings was transcribed offsite at the conclusion of all interviews. The data was systematically stratified into upper managers, middle-administrators, and line staff employees. An organizational chart was used to help identify the stratified layers of the department. The upper managers consisted of operations and efficiency director as well as the parks director. The middle level administrators consisted of athletics, parks, recreation center leaders, and program managers. The line staff consisted of any employee not designated with a title of manager or administrator and/or were not listed on the organizational chart. This was inclusive of janitorial staff, physical laborers, office assistants, summer workers, and recreational center employees. Stratification was important since different levels of employees may present different opinions about the sustainability approach. This research including stratification could have practical implications that could affect how human resource departments or program managers train and implement these sustainable practices.

The interviews were recorded during the interviews by using an Olympus model WS-311M. This qualitative data was analyzed with content analysis using QDA miner version 3.2.3 and WordStat version 5.1.19. Coding was performed utilizing observations of the researcher, previous literature, and research questions to identify codes. As code patterns develop axial coding was used to identify the broader scope and themes emerged. All digital data has been stored and password protected on a Western Digital My Book World Edition I for five years.

QDA Miner was partnered with WordStat to identify the frequency of terms and sayings such as savings, loss of job, economic benefit, job security, training, and efficiency. Key terms

were identified at the end of the interview process. A content analysis was performed to identify statements that were representative of that stratification.

Quantitative Data

Quantitative data collection procedure.

The financial operating costs of the parks and recreation department were collected via archival information. The data was be segmented into aquatics, recreation centers manned, recreation centers unmanned, athletics, and parks. The data for each individual division of the recreation department was aggregated data consisting of electricity, water, and sewer costs allocated to the department. The separate divisions were then compiled into one variable to cover all utility costs for the parks and recreation department. The data consisted of fiscal year 2009 which is directly before the environmentally sustainable program was to be initiated. Each fiscal year begins in July and ends in the month of June. The data was again looked at in six month increments post initiation of the sustainable program ending in December of fiscal year 2011. These different time periods captured how the organization was operating before implementation, directly after, and then one year after the program and helped to gauge how the organization has responded financially to the changes in environmental practices.

Quantitative data analysis procedure.

The quantitative was organized and analyzed using Microsoft Office Excel 2007 and SPSS Statistics version 19. The quantitative data was analyzed using descriptive statistics such as mean, range, and standard deviation. Basic statistical measures such as percentage in change were also used to see how much change has occurred pre-implementation and post. The amount

of cost savings per term was also discussed. Since only six months of fiscal year 2011 was collected, the data was annualized to produce an estimate of the cost of utilities for the year. This procedure has helped provide a theoretical path for the next six months. Utilizing these techniques have helped to identify which divisions received the most cost savings.

CHAPTER FOUR

Results

The financial archival data as well as the data obtained from the interview help to support each other. The financial data tells the story of how much more efficient the department is from these implemented sustainable initiatives. The data also tells us how much money was actually saved by the department. The reason the interviews were pursued was because the voice of the employees was missing from the quantitative data. Yes, savings were realized but it was important to have employees' stories to tell the story behind the numbers. An example of this was the savings realized by the aquatics department and the stories expressed by employees that supported and gave context to that data.

Archival utility bills were procured from the city of Knoxville parks and recreation department which were originally issued from the contracted utilities provider. The data was collected on a diverse sample of the following types of centers: aquatic centers, recreation centers both manned and unmanned, athletic facilities inclusive of golf courses, and parks (N = 96). The city of Knoxville's fiscal year is from July 1st-June 30th. Data was collected over a period of thirty months starting at the beginning of fiscal year 2009 and ended in December of fiscal year 2011. Archival aggregated data were utilized and descriptive statistics were calculated using the sample.

Contract Performance of Ameresco

The research question was, "Did Ameresco meet or exceed the proposed environmental improvements met or exceeded the established objectives defined in the contract?" Four

objectives were identified by the Ameresco contract. The first objective was to execute an energy savings performance contract. This task was completed. The second objective was to conduct an energy audit of all facilities. This case study only viewed the parks and recreation department. The audit was performed by the utility company, the city of Knoxville, and Ameresco in a combined effort to physically see and account for each meter.

Implementing energy reducing capital was the third objective. The cost savings shown below were a direct result of the implementation of sustainable equipment and practices. Energy reducing capital was installed, if possible, after operating hours by Ameresco personnel at all Knoxville facilities. The energy reducing capital utilized was inclusive of efficient lighting, sensor lighting, low-flow water equipment, and pool covers which can be seen at any Knoxville parks and recreation facility. As seen in appendix E, Table 2, department wide a savings of 4% was saved in fiscal 2010 and another 5% was saved in fiscal 2011 as a result of those sustainable initiatives. Citywide it was anticipated that savings of 12-25% would be realized. Since the parks department was able to contribute to the city savings, the city of Knoxville parks and recreation department has been determined to be more financially efficient than the department was before the implementation of the sustainable initiatives. The proposed environmental changes shown in appendix E, Table1, have allowed the parks and recreation department to contribute to their goal of 12-25% of savings citywide.

The last and final objective was to reduce environmental impacts both directly and indirectly greenhouse gas emissions. Since the installation of energy efficient capital such as efficient lights, low flow toilets, and low flow faucets, facilities utility costs were monitored and

decreases in energy consumption were seen. This phenomenon seen by the parks and recreation department of decreased energy consumption should then reduce environmental impacts. Since 2009, the actual cost of energy per unit has increased. The department was still able to realize financial savings and thus further increases the amount of energy saved by these initiatives. Energy production and use causes greenhouse gas emissions and since energy production and use have been decreased, this objective has been met.

The Relationship of Cost Savings to Knoxville's Sustainability Efforts

This research question determined whether cost savings were achieved as part of the city's sustainability effort. Cost savings were achieved as a result of the sustainability efforts for all but one division within the parks and recreation department. The cost savings are illustrated in Table 1, and these savings were achieved through a combined effort of all the implementations performed by Ameresco.

Aquatics was a variable in the quantitative sample that was used to identify any facilities relating to aquatics (n = 3). Overall, aquatic facilities realized a savings of $2,634.03 from the average of each six month period since the process began (M = $7,108.78, SD = 3,072.959, range = $17,243.16). It was also found that the aquatics facilities realized an overall decrease of $14,200 (36%) since the first half of fiscal year 2009. In the first six months of fiscal year 2010 alone, there was a drop in utility costs by $19,553.60 (44%). In the six month summary that ended in December, fiscal year 2011, an increase of $624.90 (8%) was seen when compared with the average of the first six months of 2009. The descriptive statistics for *aquatics* are represented in Table 2.

Manned recreation centers variable identified the city of Knoxville recreation centers that are occupied by personnel during operating hours (n = 15). The data states that in the first six months of 2009 the average month of utilities cost $28,072 were as in 2011 utilities average $24,002 that equates to a savings of $4,070 (14%). While comparing each fiscal year to 2009 data, it was concluded that manned centers have saved a cumulative sum of $58,008 ($M$ = $26,433.35, SD = 8949.158, range = $28,872.42). The largest values realized were in comparing fiscal year 2010 to fiscal year 2009 with a 19% decrease in utility costs ($31,513.58). The descriptive statistics are represented in Table 2.

The variable *unmanned recreation centers* identified the recreation centers that are primarily unoccupied by personnel during operating hours (n = 8). It was found that unmanned centers realized an overall average decrease of $316.28 in utilities per month compared to the average utility in 2009. Overall, unmanned centers realized a savings of $867.56 for each six month period since the process began (M = $5,650.79, SD = 1,491.954, range = $5,487.16). Utilities in 2009 averaged $5,805 with the new sustainability practices in place the average monthly cost of 2011 utilities dropped by $403 (-7%). Again, each fiscal year was compared to 2009 data and it was determined that a cumulative sum of $8,515 (-24%). *Unmanned recreation centers* descriptive statistics are represented in Table 2.

The fourth variable is *athletics* identifies city of Knoxville athletic facilities, athletic fields, and golf courses (n = 28). Overall, city athletic facilities, fields, and golf courses realized an increase in utilities $6,689 from the average of each six month duration since the process began (M = $29,143.98, SD = 3,870.945, range = $19,268.07). It was also found that *athletics*

realized an overall increase of $40,134 (24%) since the first half of fiscal year 2009. The largest increase of $16,694 (9%) occurred during the six month average of June, fiscal year 2010. The average cost of utilities during the first six months of fiscal year 2009 increased during the same period in 2011 by an average of $1,746 (7%) per month. The descriptive statistics for *athletics* are represented in Table 2.

Parks is the fifth and final variable consisting of all parks owned and maintained by the city of Knoxville (n = 42). The largest savings of $22,445 (34%) were realized during the six month average in December fiscal year 2010 (M = $8,117.83, SD = 2,643.257, range = $13,448.01). Utility bills going from fiscal years 2009-2010, utilities dropped a total of $14,938 (-15%). By fiscal year 2011, a cumulative savings of $29,180 (-34%) occurred by comparing all data to fiscal year 2009. In the six month summary ending in December, fiscal year 2011, a decrease of $2,374 (-21%) was seen when compared with the same time period in fiscal year 2009. The descriptive statistics for *parks* are represented in Table 2.

Department variable identified the combined utility bills for the aforementioned divisions of the parks and recreation department (N = 96). This combined sample includes *aquatics*, *manned recreation centers*, *unmanned recreation centers*, *athletics*, and *parks* (M = $76,454.73, SD = 10,415.150, range = $39,885.25). The largest savings occurred during the six month cycle ending in December fiscal year 2010, reaching a total savings of $52,055 (-11%) off utility bills. During this same timeframe there was an average monthly savings of $8,684. At the end of fiscal year 2009, at total of $941,549 was spent on utilities. At the end of fiscal year 2010, utility costs decreased by $42,697 (-9%). The data from fiscal year 2011 was annualized

and when compared to fiscal year 2010 a decrease in utilities was realized in the sum of $5,017 (-1%). The utilities in fiscal year 2011 saw a savings of $47,927 (5%) when compared with fiscal year 2009. In the six month average ending in December, fiscal year 2011 compared with fiscal year 2009 of the same period, a decrease of $4,477 (-6%) was discovered. In the sample, a cumulative savings of 15% ($69,768.39) was realized by all parks and recreation divisions within the city of Knoxville. This is substantial savings and will help contribute to the projected savings anticipated by Ameresco. Descriptive statistics of *department* are presented in Table 2.

A savings trend has occurred throughout this project. During the six month interval ending in December fiscal year 2010, $42,697 was saved compared to the previous year. The savings trend continued for the duration of the six month period ending in June fiscal year 2010 of $213 compared with the previous year. The cumulative cost of utilities over a six month period ending in December fiscal year 2011 juxtaposed with the same from 2009 proved a savings of $26,859. These savings ended in a cumulative effort of $69,768. The city went from spending $943,940 in 2009 decreasing to $901,695 in 2010 for a 4% ($42,245) savings and further increased their savings to only $896,013 for the year of 2011, for a visual depiction please refer to Table 1. Utilizing annualized data, the fiscal year of 2011 saved $47,927 (-5%).

Savings were seen in multiple divisions of the parks and recreation department. However, the largest percentage saved over the course of the implementation was realized in the aquatics division with a cumulative savings of $14,201 (36%). The largest cumulative financial savings were seen in the manned recreation centers division at $58,008 (34%).

Employee Awareness of Sustainability Practices

The last research question inquired about perceptions of parks and recreation department employees towards the sustainability practices in city government. To gain insight into employee awareness, interviews were conducted and stopped due to reaching the point of saturation ($N = 14$). The city of Knoxville parks and recreation department consists of 63 permanent employees. The sample consisted of upper management ($n = 4$), middle-administrators ($n = 5$), and line staff ($n = 5$). Once an interview was completed, it was checked for redundancy. Once this occurred and no new information was obtained from the interview. It was determined that saturation was reached for that stratification and interviews were ceased (Corbin & Strauss, 2008; Creswell, 2007; Lincoln & Guba, 1985; Morse, 1995). Content analysis was performed on the data to gain insight into employees' perceptions about environmentally sustainable practices in city government. This content was then identified through thematizing the data and the following themes were discovered.

Energy Conservation

Energy conservation was identified by all stratifications in some form or another. This theme arose when employees were discussing the benefits of the sustainable initiatives. Energy was determined to be conserved by the efforts made due to the contracted initiative. Energy conservation specific to the aquatics department was realized within the stratifications of upper management and line staff however it was best stated by employee A from upper management:

> . . . the biggest benefit that we have that we're already seeing is the pool covers that we have over all the indoor pools. The amount, and it's inevitable, you know they say a good

> pool cover, you'll probably save about 20 percent of what you're putting into it. It didn't take long at all for us to see the changes for that because they put the covers on when it was still winter. So we were immediately able to see less use of chemicals, less fill, fresh fill that we had to put in. Less taxing on the heaters and stuff to heat the water.

Influence

The upper management stratification identified more with the perception of being in greater control and influence over the contract while they also had a more direct positive impact on the sustainable initiative. All stratifications were asked about their role and how they felt their role played or did not play a part in the sustainable initiative. As interviews with upper managers reached the point of saturation, a theme of influence and change emerged. When upper manager H was asked about the role and control upper managers play within the context of environmental sustainability he stated, ". . . futuristically it's even going to be more so, because the energy management system will be managed by the superintendent." This theme was clear amongst upper managers, as they continued to identify their influence over both the contract as well as their ability to help control or guide the results of the sustainable initiative.

Organizational Disconnects

Two common disconnects occurred amongst some of the sample. There was informational disconnect which was when employees were unable to clearly identify the contracted environmental sustainable initiatives. The other disconnect identified was information disconnect which occurred when employees did not have access to information. A

string connects both identification as well as informational disconnects. Both of these disconnects occurred due to a lack of information dissemination to employees.

Informational disconnect occurred when an multiple line staff employees were unable to clearly identify the environmental sustainable initiatives. The identification of the sustainable initiatives of the contract was harder for some employees. Each employee was given a clear definition before starting the interview yet employees identified sustainability within the context of the Ameresco contract as reduction in garbage or utilizing recycling towards the end of the sustainable contract initiative. An example of this was line staff employee B stated, "I wish the city would come out here, maybe once a month, once every two weeks, and pick up paper instead of me just throwing it in the garbage." Line staff employees were not the only stratification to refer to recycling, middle administrators also commonly identified recycling as when discussing sustainable initiatives within the context of the Ameresco performance contract. Middle administrator D stated, ". . . I know some centers have recycle bins and things like that, and they've been trying to get everybody to get one, so it's just a matter of time before we get those out." Employees refer to recycling when discussing their sustainable initiatives. There is clearly a disconnect, however it is hard to identify whether this was an issue between the front office and those that implement or whether this is just a case of employees just not understanding.

Information disconnect occurred through financial or utility costs, and contract information. This theme identified any misunderstanding or lack of information distribution inclusive of financial costs or savings as well as contract objectives. This disconnect emerged at

varying levels of the sample. Although middle administrators commonly identified having meetings discussing the new sustainable initiatives, it was common to also identify the lack of discussion of utility costs and savings as seen in this statement from middle administrator C:

> I think it's been a good partnership [Ameresco and City of Knoxville], and I'm just curious to see how successful it is. And I would hope that when results start coming in, it's communicated to those of us who actually work in the centers, if it's working, if it's not working, and if it's not working / what can we do to make it better. Because if all of this effort was put into it, we should at least know whether or not it's working.

This common thread of a lack of dissemination of utility bills was found amongst almost all line staff interviewed. Line staff typically referred to physical stimuli to measure and understand potential savings such as in the case of line staff A:

> In many parts of the building, we have sensor lights, which take out the waste of energy, so we don't waste any light energy because if no one's in the room, the lights just automatically shut off.

This theme was continued through a lack of understanding of contract objectives or the lack of costs associated with the performance contract. As shown here with middle manager C:

> Not quite knowing what our objectives were in the first place, it's kind of hard to answer. But I think it really helped us along and without their assistance, I'm not quite sure it would have happened as quickly as it did.

Front line staff also realized this lack of knowledge, line staff employee F, “I'm not really familiar with the contract [objectives]?” Whereas upper management clearly understood that the success of the contract would be determined by monitoring the utility bills and cost savings reaped by these sustainable initiatives. Regarding the costs of the contract upper manager H stated:

> The start-up costs are figured into the overall budget of a seventeen-year contract with Ameresco. Eventually the million-dollar departmental budget would be theoretically reduced by a substantial degree as a payback for the contracted services, then the city reaps the reward for the next millennium.

Resistance

Resistance was a common theme as well. Resistance was the act by an employee to resist change within the context of the implementation of the environmental sustainability initiatives. Upper management also identified resistance and a learning curve that acted as a barrier during the implementation phase. The learning curve was identified primarily by upper managers and was best shown in the statement from upper manager M, “Change. People / things tend to resist change. There's a learning curve, trying to figure out how to best utilize newer technology, and it's just trying to sell it to the powers that be and the public.” This learning curve then was also interlaced with resistance. However, all stratifications maintained a common thread that some employees within the organization met the performance contract with resistance possibly attributed to the “old school mentality” of not wanting to spend money. The same mentality

believed that a project should be accomplished with as little money as possible while still meeting the current needs with little thought put towards the future need or expense of those decisions. This occurrence was best summarized by upper manager H:

> The subtle strategy in the long run is to be as efficient operationally as you can be. Because in retrospect you look back, and most of the buildings that the city parks and recreation department operates were built in a time where energy efficiency was of no use. At that point, gas was 29 cents a gallon, okay? Now, you put it at roughly four dollars a gallon, things look a lot different. And a few inches of insulation goes a long way at that point. It's perspective, and the bad news is a lot of times cities build buildings to spec on low budget. And that's sad.

A change in resistance was stated by middle manager C, "I think it's changing the mindset of people who have been doing things the same way year after year after year, and getting them used to doing things differently." Regardless of the fact that the implementation was met with some resistance in the department, the implementation still took place.

Positive Feelings

Most sustainable initiatives that were implemented across all stratifications were met with positive feelings. Positive feelings were identified by references towards the initiatives in a positive context or it could also be positive statements by the employee about how happy they were in regards to the contract implementations. Of those sampled line staff jobs daily tasks were lessened. Aquatics line staff employee F identified time savings from the initiative:

> . . . in the summertime I was adding water typically on a daily basis for probably thirty minutes to an hour depending on how hot it got out there. And with the pool cover just been there at night, I think we may add water, most weeks it's once a week. I don't know how it will go as the summer progresses. But up to this point I've been adding water once a week. For about thirty minutes to an hour.

Only one employee which was middle administrator D was able to establish any negative feelings towards the low flow toilets, ". . . the low-flow, I wasn't happy with those because sometimes things don't go down." On the other hand, Upper manager A made a positive statement that represented the majority of the entire sample, "We're able to sit back and enjoy the benefit of what Ameresco did."

CHAPTER FIVE

Discussion

The purpose of this study was to determine the efficacy, cost effectiveness, efficiency, and identify feelings of parks and recreation employees towards the outsourced sustainable initiative implemented by the partnerships between Ameresco and city of Knoxville. Efficacy was operationalized by the capacity of the infrastructure improvements to produce the desired energy and cost savings (Efficacy, n.d.). The financial efficiency in this case referred to comparing the projected savings to the actual savings (Efficiency, n.d.). Effectiveness of the study was determined by monitoring the project to see if the desired effect of energy, water, and financial savings were realized by the department (Effectiveness, n.d.). The city desired to create a sustainable infrastructure that would continually minimize operating costs and maximize energy output.

Triangulation played an important role in this study. A point of reference was established with each employee before interviews began regarding a clear explanation of the terms "going green" and environmental sustainability. The second point of reference is the financial data, which has clearly established savings due to the light sensors, water conservation devices, and higher efficiency light sources. The third point of reference is what was observed during the course of the interviews. So clearly what employees see, what employees were given by the research in print as well as verbal, and what was observed did not match up.

Contract Performance of Ameresco

The research question broached the topic of whether Ameresco was able to meet or exceed the proposed environmental improvements met or exceeded the established objectives defined in the contract. As shown in Table 1, the Ameresco contract stated four different objectives; however these objectives set forth by the contract were citywide, not just identified with the parks and recreation department. For this case study the objectives were either met or they did not meet the objective. The first objective was to execute an energy savings performance contract that was performance based. The contract was guaranteed with the intent to reduce energy costs and usage while upgrading energy related equipment. The city of Knoxville engaged in a performance contract just as previously described in the first objective. According to the description of this objective, it has not been met since the contract is still in its early stages. The implementation stage was expected to take course over two years and is nearing completion. The parks and recreation department has taken part of this initiative and the implementation stage will soon be completed.

The second objective for the performance contract was to conduct an energy audit of all city facilities. Currently, all parks and recreation department facilities have been subject to an energy audit and objective two has been met for the department. The energy audit allowed the contractors to determine which upgrades in energy equipment were both necessary and efficiently beneficial. This energy audit was also able to inform the city of meters that were no longer needed. It was also found that meters were being used for non-city owned facilities. This audit allowed the city to ensure that the meters that were associated with the facilities were correct.

The third objective set by the contract was to implement energy reducing capital. These capital improvements were chosen to create annual guaranteed energy savings which in turn a percentage would be used for annual contract payments to Ameresco. The sustainable initiatives that have been implemented were decided upon to further their goal towards the established citywide percentage of savings of 12-25%. The goal is to have the parks and recreation department contribute to the overall percentage of savings projected for the city. At this point in time, the city parks and recreation department were able to contribute to this savings goal via the energy reducing capital that has been retrofitted into the department facilities. The savings realized by the department can only be assumed to increase with the installation of the EMS systems being installed and control of all HVAC systems it can only be assumed that the savings will only increase with time.

The final objective was set to reduce environmental impacts inclusive of both direct and indirect greenhouse gas emissions. This objective is assumed to be met since the parks and recreation department is now expending fewer dollars on utilities per year than pre-implementation. It should be inferred that less dollars equals less energy, less energy in turn should decrease the use of resources needed to power the facilities. A decrease in resource usage should then reduce environmental impacts of operation. It could then be deduced that if energy use is reduced and the environmental impacts have lessened then either directly or indirectly green house gases should be reduced. In accordance with Ameresco and the City of Knoxville performance contract, all objectives have been met. Once the EMS system is installed it should only increase the savings realized by the city and the parks and recreation department.

The Relationship of Cost Savings to Knoxville's Sustainability Efforts

Over the course of this study, it was discovered that not all facilities were in receipt of the same capital updates. Some facilities received low flow water faucets, low flow toilets, lights with sensors that established use of space, HVAC replacement, efficient windows and doors, just to name a few. Since the city of Knoxville parks and recreation department has gained a Pet Safe dog park in March of Fiscal year 2010. The dog park addition created a total of $1,361.32. The monthly average cost during the six month summary of December fiscal year 2011 equated to $86.07. In July of fiscal year 2011, Knoxville Youth Sports was added and in September of the same year Safety City were also added. These two additions added an additional expense of $12,902.01.

According to the analyses, the performance contract with Ameresco has been a financial success ($N = 96$). In reference to the study of USC, a proposal had projected savings for the university that could only be realized through retrofitting facilities with improved and efficient infrastructure. This case study was similar in that manner; unlike in that case, this proposal was brought to life and honored by combined work and interaction between Ameresco and the city of Knoxville. The investment in infrastructure was similar to those found in New Meadowland Stadium. The installation of high efficiency lighting and low flow toilets and faucets decreased utility costs and increased savings. In this case, this was intriguing because the rising contracted rates were not taken into account when reviewing the data. The intent of the sustainable implementations was to create cost savings. It is imperative to state that cost savings were clearly achieved as part of the city's sustainability efforts.

Another point to be made is that as of now, HVAC has not been completely addressed. Parks and recreation facilities will be retrofitted with electronic management systems (EMS) that will be able to communicate temperatures and controlled wirelessly from an offsite computer program. This program requires all facilities to have separate IP addresses. The parks and recreation department has had to pay extra for this service however, the data will be able to be streamed real time. This should allow for better control of HVAC systems at all facilities. This could allow the program manager to adjust temperatures at unused facilities as well as ensure that patrons no longer have access to system controls thus increasing operating efficiency. This sustainable initiative may in fact continue or increase the utility savings trend currently experienced by the parks and recreation department.

Employee Awareness of Sustainability Practices

It was found that some parks employees displayed a clear lack of understanding in varying areas of the sustainable practices. This lack of understanding could potentially inhibit the employees desire to buy into the program or initiative. People do not buy into things that they do not understand and this could potentially hinder the success of the implementation for the department. If there is a misaffiliation or incomplete affiliation of greening in this case due to lack of understanding that recycling is not part of the initiative although it is a part of greening outside of this current context. The pervasive mention of recycling truly plays into the lack of understanding of this current environmental sustainable initiative. Clearly the understanding at this level needs to be addressed so that each employee can fully invest themselves in the program.

The parks and recreation department has no long term objectives or vision for their organization. This could also contribute to the lack of understanding by employees. Employees were unable to understand the depth of the initiative as well as the breadth. The possible implications of these efforts could help the department stretch their finances to meet the current needs of the organization. This initiative spans far larger than this department, but this department does play a role as a contributor to efficiency for the city of Knoxville. Not establishing a long term objective or vision could limit the vision of their own employees and it could possibly have an adverse affect on their ability to see why the city and parks department have participated in this environmental initiative.

This lack of vision could also adversely affect managers and leaders. Middle administrators had meetings that discussed the initiatives as well as why the organization thought it necessary to partake in this contract. Middle administrators were given the task to distribute this information to line staff employees. In this current economy employees are being subjected to smaller raises, budget cuts, and limited staffing at facilities. The line staff as well as some middle administrators were unaware of the actual costs associated with the outsourcing of this environmental initiative. Some employees thought the city spent a lot of money on this investment in capital and they were unsure why. This lack of vision and lack of information about costs may lead an employee to foster even greater organizational disconnects as well as negative feelings about not only the initiative but also the department, the organization, and possibly their job.

The city of Knoxville parks and recreation department could take different steps to rectify the organizational disconnects that have been indentified in this study. The parks and recreation department could distribute employee e-bulletins or newsletters to inform employees of the contract, long term goals, the master plan, the implementation progress, and the financial savings that have occurred due to these sustainable initiatives. A web page specifically dedicated to the Ameresco contract and the sustainable initiatives could also be another option for information dissemination. Employees could gain access to web pages, e-bulletins, or newsletters now that parks and recreation centers have been retrofitted with technology that allows for internet connectivity. If not, the employee would still be able to access this information at home or their local public library. Now it should still be understood that all employees regardless of their internet access or technological skills should be given the same information. A way to ensure that the information is distributed to all employees would be to place all information on the second page of an employee paystub. According to an article, the National League of Cities looked into the use of smart phone or tablet apps to deliver information to employees (Pulidindi, 2010). Some cities like Grand Rapids, Michigan have created online gateways that provide access to information regarding their environmental initiatives. While in Palo Alto, California, they city utilizes a software package that monitors and distributes data related to their environmental initiatives (Moulder, 2011). According to the International City/ County Managers, it is important in a downturned economy to keep recession-stressed employees informed through intranets, employee newsletters, monthly staff meetings, social networks, and providing suggestion boxes for voicing opinions (Glossa, 2009). Possible solutions to

organizational disconnect do exist and it is up to each organization to decide which information delivery system or combination thereof that would best suit their needs.

The contract between Ameresco and the city of Knoxville fits well into the city of Knoxville's master plan. The two truly go hand in hand with the city parks and recreation department looking to extend the lifespan of their existing facilities. The contract allowed Ameresco use their knowledge and experience to invest in energy efficient capital to retrofit the existing buildings. The parks and recreation department had considered looking at low light pollution and higher efficiency stadium lights for their fields however Ameresco informed the city that this investment would not create the costs savings needed. Previous lighting improvements made by the city were also not as efficient as they could be so all gymnasiums were retrofitted with new light ballasts and high efficiency lighting controlled by light sensors. The result was a lower bill, higher efficiency, and higher foot candle output. The parks and recreation department master plan wants to ensure that money is spent as efficiently as possible and these new sustainable initiatives help to stretch the lifespan of their current facilities as well as create cost savings for the already strained budget. The contract with Ameresco allows the city to meet begin on their path to achieving their master plan and this connection should be divulged to parks and recreation employees. Even though the majority of the sample identified positive feelings towards the initiatives, it could create even greater feelings of positivity by employees towards the initiative by having this understanding.

Even employees that identified some lack of understanding of the initiative as well as contract objectives, the majority of the sample regardless of stratification identified cost savings

as a primary cause for the sustainable initiative. Middle administrator J was able to express this when he stated, "Budget cuts up now. Anything that saves money, they're all for. At least to what I know, to what they say, it can be cheaper if done right." This statement speaks volumes about what previous literature identified as a financially hard time issues and that other entities chose to utilize sustainable initiatives to realize savings just as this department has done in this single case study.

Awareness of energy usage has increased among all stratified levels. Line staff employee B stated:

> The thing of it is, like I have a closet down the way. This closet, usually I'm the only one going in there. You turn the light on when you go in, and I always turn the light off when I come out. But now with it being on the light sensor, I do the manual shut-off to save even more electricity.

The middle administrators felt the same as shown in a statement from parks and recreation employee L, "The lights, if no one is in a certain area, the lights will go out, and they will only come on if someone enters the room. So that's saving money again." Upper management also identified higher levels of awareness, as seen with upper manager H:

> Quarterly meetings come to mind right off the top to review energy uses and energy audits. When you're looking at the number of ball fields and lights used, it's not uncommon in pool operations, any of our centers that have pools were averaging $5000 a month in utility costs because of either heating water or re-circulating water. That's

> compared to roughly $1000 or $1500 a month for centers that didn't have those. And it was interesting to watch, particularly through some of the electric bills, where some of those commonalities we really didn't realize we had before, mathematically they're just there.

The most important part of this single case study was the financial data and the savings realized by the department. Interviews were utilized to help paint a picture of what was truly happening within this organization throughout this implementation. Employees at varying levels in the department were interviewed to gain insight into their feelings towards the sustainable initiatives established by the Ameresco performance contract. As seen in the results section employees were able to tell their stories of how they truly feel about the department going green. Overall the majority of employees regardless of their stratification were able to feel positive about either their role in the conservation of energy or cost savings realized through these initiatives.

Limitations

Despite the inherent value of this study it does not come without limitations. The first limitation lies in the constraints of the case study method. For example, case studies can produce "fuzzy" generalizations, which is a term that means, "…something may happen, but without any measure of its probability" (Bassey, 1999, pp. 46, 48-53). The most important note about this idea was that by stating the word "may" it did not weaken the way in which the research was conducted, instead it reminded the readers that many variables are in operation in case studies that lead to the specific outcomes (Bassey, 1999, p. 51). It is well understood that

since this study took place in a real world setting that a multiplicity of different variables may have affected the outcome. It was also important to note that each organization that partakes in investing in their infrastructure will have their own variables to deal with, and that may or may not have an effect on the outcome.

Second, the duration of the study leads to a concern. This study was only covered the period from 2009 to 2011 during the transition period into environmental sustainability practices by the parks and recreation department. This transition period only consisted of thirty months of data. Since the timeline was short and the last major implementation had not begun, the data may not develop an accurate picture of how the practices and the organization might react in the future. That being said, in the future the organization may choose to either continue or discontinue their quest for environmentally sustainable practices. Also, all long-term benefits may be hard to determine at this point in time.

A limitation was identified as the tenor or length of time that an employee held their current position within the department. During one interview, subject A had only recently been in the new position, however the subject had been with department for over a year. Another limiting factor was that the main point of contact for the city department had retired from his/her position and he/she has been a part of this project since day one. This occurrence caused a delay in data collection by two months.

A fourth limitation related to the formatting of the archival data. The data was in the format of dollars spent per month for utilities, not in terms watts or gallons. So the data did not take into account the increased utility rates. Some increases in price for utilities were seen and

this might be attributed to utility rate increases or addition of new facilities. For example, the athletics and fields division saw an increase (7%) in utilities cost during the six months of operation in fiscal year 2011 compared to the same period of fiscal year 2009. Since utility rates were not considered, the actual usage of the facilities in terms of watts may have actually been lower during the first six months of 2011 compared with the term in 2009. However, since the data was in terms of dollars spent and not in terms of wattage, that is data that cannot be produced. The savings identified were therefore actually showed as a change in cost per month not the change in units (e.g. watts or gallons) used for facility operations. That being stated, it was important to note that even with cost increases, the department was able to realize savings which in turn demonstrated that the units of energy must have decreased.

The archival data was also in aggregated format. Within the utility bills, there were occasionally credits that appeared. Several factors may have contributed to these credits such as but not limited to overcharges, leaks, undercharges, etc. Some of the data sets had credits during the month from which they originated while other data sets were given credits during the month when the bill was received. The reasons for the inconsistencies were because the original file was distributed to four different divisions consisting of aquatics, recreation centers, athletics, and parks. Each of these divisions was and still is responsible for the creation and maintenance of their own spreadsheets. All data was originally segmented by the utility company, some divisions of parks and recreation created aggregate versions of this data consisting of electric, water, and sewer while others segmented the data. To create a uniform set of data, all segmented archival data was compiled into an aggregate version.

During the case study time frame, some facilities were added to the park and recreation department, while others were eliminated. Under the athletics division multiple sites were added throughout the term of this study including the following. KYS was added beginning in January of 2011. Holston River and Victor Ashe park were added six months into the thirty month cycle. Gary Underwood was added five months into the study. Under the umbrella of parks a dog park was added in March of 2010.

There were a few instances were utility bills were left blank. According to those in charge of review of the utility bills, it was stated that the utility company had occasionally read the meters every other month. This led to some confusion when trying to analyze the data. This procedure also led to inconsistent spikes and valleys in the archival data. One exceptional spike in utility costs was noted and regarded Claude Walker in August of fiscal year 2010; there was a utility increase of $2,000. According to resources, it was quite possibly attributed to a water leak. The procedure for a water leak proceeds as follows: a leak is discovered and the utility company would use a one month billing cycle post the leak being fixed. This was performed in this manner because it allowed the utility company to determine the amount to be credited to the facility. At the third month post discovery of the leak, a credit reared its head and the bill was adjusted. On occasion credits or usage would also be attached to the wrong facilities. Another note was made about a significant valley in December of fiscal year 2010 at Caswell fields. An average was developed from the month of December over the past two years that equated to $7,500.66. The actual bill for December was found to be $7,415.76 lower than the developed average. These errors in the data led to a large variance in the standard deviations for each

division as shown in the results section. It is known that *SD* is sensitive to extreme values (Coladarci, Cobb, Minium, & Clarke, 2010, pp. 76-81).

CHAPTER SIX

Recommendations for Future Research and Conclusion

Recommendations for Future Research

Future research is pivotal to understanding the role environmental sustainability will play in the field of parks and recreation. This study could be expanded by identifying the barriers to adopting new environmental initiatives. Barriers could potentially consist of knowledge of staff, financial costs, or even employees unwilling to change. Research could also be conducted around different types of adoption as well as different ways to train employees to determine the best way to implement sustainable programs and practices. Future studies should include different city sizes that are also adopting an environmental performance contract. Analyzing different city sizes should help to show how each city will respond to the sustainability practices. Future studies should include different recreation, leisure, and sport organization types and their adoption of sustainability practices.

Researchers looking to duplicate this research would be advised to make a few modifications. First of all future research should include the contracted rates. In hindsight, it would be optimal to analyze the quantity of watts for electricity and quantity of gallons for water or sewer. This would also help to compare the current usage in terms of dollars using the same rates. This type of comparison would allow equal comparison in terms of usage from year to year. Secondly, the data should be segmented into specific utilities such as water, electricity, sewer, etc. This should allow better analysis of a department's performance. Regarding the

qualitative side, it would have been beneficial to directly ask employees what knowledge they had regarding the performance contract and ask for specifics.

Future research regarding the quantitative side should be wary that if a more rigorous methodology, such as cost benefit analysis was used then perhaps the results may have been different. So comparing all positive benefits and negative costs could possibly lead to different advice on actions and sustainable practices to implement. There is a metrics problem that occurs in the fact that there is zero upfront dollars invested. It would not be fair to compare the dollars invested versus the cost per unit of consumption. The again being that there is zero upfront cost to the city and the actual cost per unit is covered initially by Ameresco.

Other future studies should focus on how organizations respond to environmental policy changes. The implications of these studies could identify how to best support environmental policy changes within an organization. The concept of when an organization decides to partake in environmental sustainability measures should be analyzed. Understanding the idea of "when" should help to understand what stimulants will activate an organization. Future research should also consist of analyzing what an organization can do if they have a dearth of human or financial resources. Since it is already known that financial resources are limited due to the weakened economy, it is very important to find out what financial options organizations will have when making environmental sustainable practice decisions. Therefore, research should be done on financial options that are available to private and public organizations.

Conclusion

It is reasonable to believe that the financial archival data has shown that the performance contract with Ameresco has been a success, allowing the department to realize savings. This data suggests that the knowledge base of Ameresco energy auditors has allowed the city of Knoxville parks and recreation department to continue on their path to greener facilities and fiscal sustainability. Sustainable practices in terms of investment in capital and infrastructure have created an environment to make the operation of the department greener. This case study is similar to the actions found in Seattle, San Francisco, and New York City. The city of Knoxville parks and recreation department has made an effort to become greener. This greening effort was led by the initiation of the performance contract with Ameresco. The chief advantage of this initiative is that there is no upfront cost for the city. Ameresco receives payment directly from a portion of the savings that have come to fruition. This is a better option than what New York City experience with high upfront capital costs coupled with the fact that New York City has to worry about payback for their investment in sustainable initiatives. These savings have come to fruition.

The improvements in infrastructure could have a profound effect on the department. Just as Chapman (2008) suggested, fiscal sustainability does rely on the infrastructure. It has been proven here that investment in sustainable infrastructure can lead towards the end of fiscal sustainability. With the current changes and investment in capital and infrastructure improvements the city is well on its way towards the end of meeting or exceeding the benchmarks established by the 2007 mandate by President George Bush to meet the 2006 sustainability practices principles by the year 2016.

The qualitative data suggests that line staff employees experience a feeling disconnect regarding the information about the organization such as the performance contract objectives, identification of sustainable initiatives, and how the organization measures their success. This could again affect personal investment by employees into the sustainable program.

Organizations and public administrators may view the sustainable initiatives as success for the organization; however this should act as a lesson to other organizations looking to go green. By establishing hard lines of communication regarding contract objectives and establishing ways to measure success may help to establish a stronger commitment from all organizational members. This inclusion of all employees and clear dissemination of information may help the members feel more invested in the programs and the department. Having the knowledge of what the initiatives are and why the organization chooses to perform these upgrades could help the employee want to help with the savings by performing a more active role.

The savings realized by the City of Knoxville are real. These financial savings realized from the sustainable initiative has lessened the financial burden on the parks and recreation departments operating budget. This project can be considered to be fiscally sustainable. Even with rate increases implemented by the utility company savings were still realized. This savings leads to the conclusion that energy consumption must have been decreased even without the implementation of the third stage, which quite possibly could contribute to some of the largest savings in the future. Therefore, this project meets the demands of today and does not compromise the long term demands of the future.

It could be implied from this case study that other organizations of similar size could have the potential to realize financial savings by partaking in a similar performance contract that implements sustainable practices. If financial savings are realized these funds could be used for other capital investments, decreasing overall yearly budgets, paying for delayed maintenance, or invested in new programs or services.

REFERENCE LIST

REFERENCES

Ameresco. (2010). Energy Conservation. Retrieved March 24, 2010, 2010, from http://www.ameresco.com/e-conserv.asp

American Society of Civil Engineers. (2009). *Infrastructure Report Card 2009*. Retrieved from http://www.infrastructurereportcard.org/report-cards.

Arrandale, T. (2006). National Parks Under Pressure. *CQ Researcher 16*(35), 817-840.

Babbie, E. R. (2007). *The practice of social research*: Wadsworth Pub Co.

Babiak, K., & Trendafilova, S. (2010). CSR and Environmental Responsibility: Motives and Pressures to Adopt Green Management Practices. *Corporate Social Responsibility and Environmental Management*, n/a-n/a. doi: 10.1002/csr.229

Baglioni, A., & Cherubini, U. (1993). Intertemporal budget constraint and public debt sustainability: the case of Italy. [Article]. *Applied Economics, 25*(2), 275.

Barnes, M., & Brayley, R. (2006). Institutional readiness and grant success among public recreation agencies. [Article]. *Managing Leisure, 11*(3), 139-150. doi: 10.1080/13606710600720739

Bassey, M. (1999). *Case study research in educational settings*: Open University Press.

Baughn, C. C., Bodie, N. L., & McIntosh, J. C. (2007). Corporate Social and Environmental Responsibility in Asian Countries and Other Geographical Regions. *Corporate Social Responsibility and Environmental Management, 14*(4), 189-205. doi: 10.1002/csr.160

Benepe, A. (2008). THE BIG (GREEN) APPLE. [Article]. *Parks & Recreation, 43*(5), 34-39.

Brundtland, G., & Khalid, M. (1987). *Our Common Future*. Oxford, NY: Oxford University Press.

Burke, B. F. (2007). ADAPTIVE LEADERSHIP AS A FACILITATOR OF PUBLIC ENGAGEMENT ON ENVIRONMENTAL SUSTAINABILITY ISSUES. [Article]. *Administrative Theory & Praxis (Administrative Theory & Praxis), 29*(3), 412-431.

CBER. (2000). Tennessee and Metro/Micro Statistical Areas. *Population Data* Retrieved October 3, 2010, 2010, from http://tndata.utk.edu/population/mmpopest.aspx

Chapman, J. I. (2008). State and Local Fiscal Sustainability: The Challenges. [Article]. *Public Administration Review, 68*, S115-S131. doi: 10.1111/j.1540-6210.2008.00930.x

Coladarci, T., Cobb, C. D., Minium, E. W., & Clarke, R. C. (2010). *Fundamentals of statistical reasoning in education*: Wiley.

Corbin, J. M., & Strauss, A. L. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory*: Sage Publications, Inc.

Cordano, M., Marshall, R., & Silverman, M. (2010). How do Small and Medium Enterprises Go "Green"? A Study of Environmental Management Programs in the U.S. Wine Industry. [Article]. *Journal of Business Ethics, 92*(3), 463-478. doi: 10.1007/s10551-009-0168-z

Creswell, J. W. (2007). *Qualitative inquiry & research design: Choosing among five approaches*: Sage Publications, Inc.

D, V. (2009). What the Future Holds. [Interview]. *Parks & Recreation, 44*(9), 70-73.

DOE. (2008). *Energy Efficiency Trends in Residential and Commercial Buildings*. Washington, D.C. : US Department of Energy Retrieved from http://apps1.eere.energy.gov/buildings/publications/pdfs/corporate/bt_stateindustry.pdf.

Effectiveness. (n.d.). In *Merriam-Webster's online dictionary* Retrieved from http://www.merriam-webster.com/dictionary/effective

Efficacy. (n.d.). In *Merriam-Webster's online dictionary* Retrieved from http://www.merriam-webster.com/dictionary/efficacy

Efficiency. (n.d.). In *Merriam-Webster's online dictionary* Retrieved from http://www.merriam-webster.com/dictionary/efficiency

Elmendorf, D. (2009). The State of the Economy and Issues in Developing an Effective Policy Response. *Statement of the Director of the Congressional Budget Office before the Committee of the Budget, US House of Representatives*.

Eltham, D. C., Harrison, G. P., & Allen, S. J. (2008). Change in public attitudes towards a Cornish wind farm: Implications for planning. *Energy Policy, 36*(1), 23-33. doi: DOI: 10.1016/j.enpol.2007.09.010

Environmental Protection Agency. (2011). Brownfields Retrieved March 3, 2011, from http://www.epa.gov/brownfields/

EPA. (2009). *Memorandum of Understanding Between the United States Environmental Protection Agency and the New Meadowlands Stadium* Environmental Protection Agency Retrieved from http://www.epa.gov/region02/greenteam/pdf/new_meadowlands_stadium_MOU.pdf.

Frauman, E., & Norman, W. (2003). Managing Visitors via" Mindful" Information Services: One Approach in Addressing Sustainability. *Journal of Park and Recreation Administration, 21*(4), 87-104.

Glossa, D. M. (2009). How to Manage Recession-Stressed Staff. *Forum Magazine,* (November/December). Retrieved from icma.org/en/Article/100189/How_to_Manage_RecessionStressed_Staff

Golicic, S. K., Boerstler, C. N., & Ellram, L. M. (2010). 'Greening' Transportation in the Supply Chain. [Article]. *MIT Sloan Management Review, 51*(2), 47-55.

Hassan, O. A. B. (2006). An Integrated Management Approach to Designing Sustainable Buildings. *Journal of Environmental Assessment Policy and Management, 8*(2), 223-251.

Horne, R. E. (2009). Limits to labels: The role of eco-labels in the assessment of product sustainability and routes to sustainable consumption. [Article]. *International Journal of Consumer Studies, 33*(2), 175-182. doi: 10.1111/j.1470-6431.2009.00752.x

HRG, S. (2007). *Evolution of An Economic Crisis?: the Subprime Lending Ending Disaster and the Threat to the Broader Economy.* Washington, D.C. : US Government Printing Office.

Jamali, D., & Sidani, Y. (2008). Classical vs. Modern Managerial CSR Perspectives: Insights from Lebanese Context and Cross-Cultural Implications. *Business and Society Review, 113*(3), 329-346. doi: 10.1111/j.1467-8594.2008.00323.x

Jarvi, C. K. (1997). The greening of parks and recreation. [Article]. *Parks & Recreation, 32*(11), 86.

Kåberger, T. (2003). Environmental labelling of electricity delivery contracts in Sweden. [Article]. *Energy Policy, 31*(7), 633. doi: 10.1016/s0301-4215(02)00148-9

Kahn, M. E. (2009). The Green Economy. [Article]. *Foreign Policy*(172), 34-38.

Kiernan, M. J. (2001). Eco-Value, Sustainability, and Shareholder Value: Driving Environmental Performance to the Bottom Line. *Environmental Quality Management, 10*(4), 1-12. doi: 10.1002/tqem.1100

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Thousand Oaks, CA: Sage Publications, Inc.

McCollum, T. (2009). Go Green, Save Green. [Article]. *Internal Auditor, 66*(4), 16-16.

McGillion, A., & Senn, J. (2009). *EPA, New York Giants and New York Jets Team Up to Make New Meadowlands Stadium a Beacon of "Green"*. New York City: US Environmental Protection Agency Retrieved from http://yosemite.epa.gov/opa/admpress.nsf/0/EB8BD7874DB85F38852575C8005452A8

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*: Jossey-Bass.

Morse, J. M. (1995). The significance of saturation. *Qualitative health research, 5*(2), 147.

Moulder, E., Reed, A., & Svara, J.H. (2011). Breaking New Ground: Promoting Environmental and Energy Programs in Local Government: ICMA.

Muret, D. (2008). New Meadowlands Stadium just misses 'green' certification. *Street & Smith's Sportsbusiness Journal, 11*(23), 12-12.

Nandagopal, R., & R.N., A. S. (2009). Wal-Mart's Environmental Strategy. *Asian Journal of Management Cases, 6*(2), 119-133. doi: 10.1177/097282010900600204

Nordström, H., & Vaughan, S. (1999). *Trade and environment*: World Trade Organization.

Payne, L. L., & Schaumleffel, Nathan A. (2008). Relationship Between Attitudes Toward Rural Community Parks and Recreation and Rural Community Satisfaction. [Article]. *Journal of Park and Recreation Administration, 26*(3), 116-135.

Pitelis, C. N. (2007). EUROPEAN INDUSTRIAL AND COMPETITION POLICY. [Article]. *Policy Studies, 28*(4), 365-381. doi: 10.1080/01442870701640740

Pulidindi, J. (2010). Webinar to Examine Apps for Local Government and the Role of Elected Officials. *Nation's Cities Weekly 33*(31), 5.

San Francisco Building Raises Bar on Sustainability. (2007). [Article]. *In Business, 29*(4), 8-8.

Sherman, M. (2008). *Will Workers Survive State Budget Belt-Tightening*. Center for Economic and Policy Research (CEPR), CEPR Reports and Issue Briefs. Retrieved from http://www.cepr.net/documents/publications/2008-12-Will-Workers-Survive-State-Budget-Belt-Tightening.pdf

Simons, H. (1996). The paradox of case study. *Cambridge Journal of Education, 26*(2), 225-240.

Solmes, L. A. (2009). *Energy Efficiency: Real Time Energy Infrastructure Investment and Risk Management*: Springer.

Stake, R. E. (1995). *The art of case study research*: Sage Publications, Inc.

State and Local Governments Tap into the Green Building Trend. (2006). [Article]. *Buildings, 100*(5), 16-18.

Survival of the Greenest. (2009). [Article]. *PM Network, 23*(4), 14-15.

Tapella, R. C. (2008). *Prepared Remarks on the Government Printing Office and Sustainability*. Paper presented at the National Printing & Equipment Suppliers 75th Annual Conference, St. Pete Beach, FL.

US. (2010). Quick Facts. from US Census Bureau http://quickfacts.census.gov/qfd/states/47/4740000.html

Waller, S. N. (2009). Strategic "Greening" for Municipal Park and Recreation Agencies. *Public Administration Times, 32*(4), 4-5.

Wang, T., & Watson, J. (2010). Scenario analysis of China's emissions pathways in the 21st century for low carbon transition. [Article]. *Energy Policy, 38*(7), 3537-3546. doi: 10.1016/j.enpol.2010.02.031

Weil, M. (Producer). (2009, February 23, 2010). City of Knoxville Energy and Sustainability Intitiative. Retrieved from http://www.docstoc.com/docs/27026222/City-of-Knoxville-Energy-Sustainability-Initiative

Yin, R. K. (2009). *Case study research: Design and methods*: Sage Publications, Inc.

APPENDICES

Appendix A

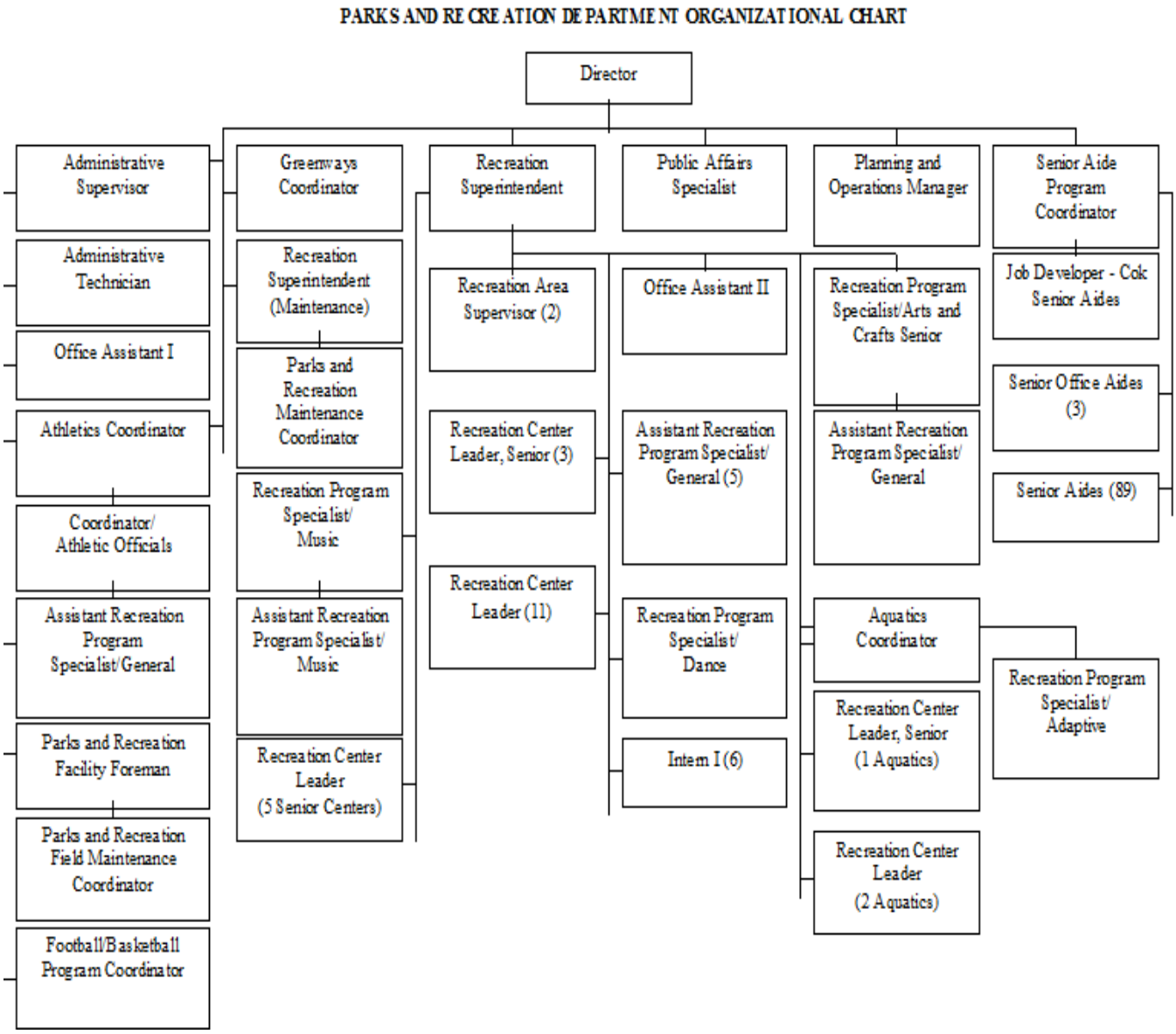

Figure 1. City of Knoxville, department of parks and recreation organizational chart from 2011.

Appendix B

Interview Schedule

1. What is your position within the parks and recreation department?
2. What is your role in the department with respect to environment/sustainability initiatives?
3. Do you feel your role in the department has an effect on the outcome of the environmental initiative?
4. Please describe the extent of your organization's involvement in and concern for the environment. What do you feel is your department's responsibility to the environment?
5. What are the major costs/ benefits that your department faces from these sustainable initiatives?
6. What challenges does your department face in this area of focus (environmental sustainability practices)?
7. What motivated your organization to address environmental concerns?
8. (How) has awareness on environmental issues in general changed/ affected department operations?
9. How are decisions made regarding the focus and extent of involvement in this area?
10. To what extent has the director of the department been a factor in your organization's environmental focus?
11. What is your organization's level of commitment in this area: financial investment; staff/ other resources, is this a growth area?
12. What are your department's long term objectives regarding environmental sustainability (ie., long term growth/sustainability of business/ strategy)?
13. What role did the performance contract with Ameresco play in helping to achieve your department objectives in environmental sustainability?
14. What kind of management systems have been implemented to support and ensure that these environmental sustainability programs are delivered effectively?
15. How will you measure your environmental success (ie., solid waste reduction, energy consumption, etc.)?
16. (How) have environmental initiatives contributed to the bottom line (ie., relationship between environmental and financial performance)?
17. What does the future hold for recreation departments and environmental sustainability?
18. Is there anything we have not covered that you would like to share with me about your experiences with environmental sustainability practice initiatives?

Appendix C

INFORMED CONSENT STATEMENT

Exploring the effectiveness of environmentally sustainable practices in municipal government:

A case study of the City of Knoxville's department of parks and recreation

Principal Investigator: Anthony M. Brown

INTRODUCTION

You are invited to participate in this research study. Before agreeing to participate in this study, it is important that you read the following study information. This statement describes the purpose of the research as well as the procedures, and any benefits or risks. Also described is the alternative procedure available to you, as well as your right to withdraw from the study at any time. The purpose of this study is to gain information about whether environmental sustainability practices work and to determine how much money can be saved. The other purpose is to learn how employees feel about environmental practices as well as how the employees react to the new environmental changes within the department.

INFORMATION ABOUT PARTICIPANTS' INVOLVEMENT IN THE STUDY

Upon consenting to partake in the study, the participant will be explained the definition of environmental sustainability practice. The principal investigator will assign an alphabetical character to each participant. This character will be used to identify the participant so no names will be used during the recording. The participant will then be asked permission to allow digital audio recording of the interview. Upon approval, the audio recorder will be started and the participant will be asked to respond to a series of questions. There are a total of eighteen questions that will be asked by the principal investigator. Upon completion of the interview the participant will be thanked for their time and the recorder will be stopped.

The interview process should take between thirty minutes to an hour for the session to be completed. Digital audio recording will be used to make sure that the participants answer will be recorded accurately. Upon completion of the interview the digital audio will be transcribed and reviewed by the principal investigator. The audio recording will be held on a password locked hard drive for five years.

RISKS

There are no known risks or discomforts that are anticipated from your participation in this study. Potential risk from partaking in this interview may be emotional discomfort or stress while being asked questions.

Participant's initials: _____

BENEFITS

The anticipated benefit of participation is the opportunity to contribute your opinions about the environmental sustainability changes as well as the opportunity to contribute your professional knowledge to this case study.

CONFIDENTIALITY

All information gathered during this study will remain confidential in a locked electronic file. The transcribed data obtained from the digital audio recording will be held in a locked file on the principal researcher's laptop. The data will also be backed up on a locked hard drive that will be stored in the personal researcher's household. Data will be stored securely and will be made available only to persons conducting the study unless participants specifically give permission in writing to do otherwise. No references will be made in oral or written reports which could link participants to the study. The participant's names will not be available to anyone other than the principal researcher. The results of the research will be published in the form of a graduate paper and may be published in a professional journal or presented at professional meetings.

COMPENSATION (*If applicable to your study, add compensation information here*)

No compensation will be offered for participation in this study.

EMERGENCY MEDICAL TREATMENT

The University of Tennessee does not "automatically" reimburse subjects for medical claims or other compensation. If physical injury is suffered in the course of research, or for more information, please notify the investigator in charge.
(Anthony Brown at (865) 604-5030)

CONTACT INFORMATION

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study,) you may contact the researcher, Anthony Brown, at 5612 S. Briscoe Circle, Knoxville, TN 37912, and (865) 604-5030. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (865) 974-3466.

Participant's initials: _____

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be returned to you or destroyed.

CONSENT

I have read the above information. I have received a copy of this form. I agree to participate in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

Appendix D

FORM B APPLICATION

All applicants are encouraged to read the Form B guidelines. If you have any questions as you develop your Form B, contact your Departmental Review Committee (DRC) or Research Compliance Services at the Office of Research.

FORM B

IRB # _____

Date Received in OR _____

THE UNIVERSITY OF TENNESSEE

Application for Review of Research Involving Human Subjects

I. IDENTIFICATION OF PROJECT

1. Principal Investigator Co-Principal Investigator:
Anthony Michael Brown
5612 South Briscoe Circle
Knoxville, TN 37912
865-604-5030
abrow109@utk.edu

Faculty Advisor:
Dr. Steven Waller
1914 Andy Holt Avenue
University of Tennessee
Knoxville, TN 37996-2700
865-974-1279
swaller2@utk.edu

Department: Kinesiology, Recreation, and Sport Studies

2. Project Classification: Thesis

3. Title of Project: Exploring the effectiveness of environmentally sustainable practices in municipal government: A case study of the City of Knoxville's department of parks and recreation

4. Starting Date: Upon IRB Approval

5. Estimated Completion Date: May 5, 2011

6. External Funding (if any)**:** N/A

Grant/Contract Submission Deadline: N/A

Funding Agency: N/A

Sponsor ID Number *(if known)*: N/A

UT Proposal Number *(if known):* *N/A*

II. PROJECT OBJECTIVES

The primary objectives of this study are:

1. Explore whether the proposed environmental improvements met or exceeded the established benchmarks defined in the contract.
2. Explore employees' perceptions about environmentally sustainable practices in city government.
3. Examine whether cost savings were achieved as a part of the city's sustainability efforts

III. DESCRIPTION AND SOURCE OF RESEARCH PARTICIPANTS

Approximately 20 employees (combined part-time and full-time, above age 18) of the City of Knoxville's parks and recreation department will be interviewed as a part of the proposed study. No incentives will be offered for participation.

IV. METHODS AND PROCEDURES

Upon receiving all necessary consent from the participant, single, face-to-face, circa thirty minute semi-structured interviews will be conducted. When the employee agrees to participate, then an onsite interview will be scheduled at the convenience of the employee. The researcher will drive to a public location to perform the interview. Each subject will identify themselves as subject A,B,C, etc. The interview will consist of eighteen questions. The participant will be given the chance to answer each question or decline to comment.

With permission of the participant, the interview will be digitally audio recorded and transcribed by the researcher. The digital audio files will be kept in a locked folder on a locked hard drive on the principal investigator's personal computer and will be held for five years after the completion of the thesis.

A transcriber will transcribe all recordings. The transcriptions will be analyzed to identify themes and meanings that may help explain employees' feelings towards environmentally sustainable practices being adopted by the parks and recreation department.

V. SPECIFIC RISKS AND PROTECTION MEASURES

There are no known risks to the participant in this study. In an effort to protect the identity of the participant from this risk, each participant will be assigned an alphabetical letter and refer to themselves in that manner.

Confidentiality of data will be ensured by limiting access to the data to the principal investigator and the faculty advisor.

The participant has the option to decline answering any questions and the participant can end the interview at any time without penalty. If the participant decides to end the interview at any point in time, then all data collected to that point will be erased by the researcher.

VI. BENEFITS

This study may greatly contribute to the current dearth of knowledge regarding environmental sustainability in parks, recreation, and leisure. This case study will provide a real world experience and will display how the organization reacts internally as well as financially. This research will help hopefully become the grounding that is needed in this area and will most likely spur additional research on environmental sustainability practices.

VII. METHODS FOR OBTAINING "INFORMED CONSENT" FROM PARTICIPANTS

Before the start of the interview, the researcher will ask the participant to read and sign an "informed consent" form. The researcher will also sign the form. Both the participant and the researcher will retain copies with both signatures on them.

The researcher will then ask the participant if they have any questions before beginning the interview. If there are no questions at that time, then the interview will be begin.

VIII. QUALIFICATIONS OF THE INVESTIGATOR(S) TO CONDUCT RESEARCH

The principal investigator of this study is a second year master student, having completed a three hour research methods course. The principal investigator has also completed the IRB training course and certification hosted by CITI. Dr. Steven Waller will guide the work of the principal investigator. Dr. Waller is an experienced researcher who has guided the work of eight master's degree candidates and currently serves on the committee of three doctoral students here at the University of Tennessee.

IX. FACILITIES AND EQUIPMENT TO BE USED IN THE RESEARCH

Equipment to be used includes the principal investigator's personal laptop and Olympus WS-311M digital voice recorder. Data will be stored on the researcher's personal HP laptop and exported to a locked external Western Digital World Book I hard drive in the principal investigator's house. Microsoft excel

2007, IBM SPSS Statistics version 19, QDA miner version 3.2.3 and WordStat version 5.1.19 will be the software used to analyze the data.

X. RESPONSIBILITY OF THE PRINCIPAL/CO-PRINCIPAL INVESTIGATOR(S)

The following information must be entered verbatim into this section:

By compliance with the policies established by the Institutional Review Board of The University of Tennessee the principal investigator(s) subscribe to the principles stated in "The Belmont Report" and standards of professional ethics in all research, development, and related activities involving human subjects under the auspices of The University of Tennessee. The principal investigator(s) further agree that:

1. **Approval will be obtained from the Institutional Review Board prior to instituting any change in this research project.**
2. **Development of any unexpected risks will be immediately reported to Research Compliance Services.**
3. **An annual review and progress report (Form R) will be completed and submitted when requested by the Institutional Review Board.**
4. **Signed informed consent documents will be kept for the duration of the project and for at least three years thereafter at a location approved by the Institutional Review Board.**

XI. SIGNATURES

ALL SIGNATURES MUST BE ORIGINAL. The Principal Investigator should keep the original copy of the Form B and submit a copy with original signatures for review. Type the name of each individual above the appropriate signature line. Add signature lines for all Co-Principal Investigators, collaborating and student investigators, faculty advisor(s), department head of the Principal Investigator, and the Chair of the Departmental Review Committee. The following information should be typed verbatim, with added categories where needed:

Principal Investigator: __Anthony M. Brown_____

Signature: _____ Date: _____

Co-Principal Investigator: __Dr. Steven N. Waller, Ph.D._____

Signature: _____ Date: _____

Student Advisor (if any): __Dr. Steven N. Waller, Ph.D._____

Signature: _____ Date: _____

XII. DEPARTMENT REVIEW AND APPROVAL

The application described above has been reviewed by the IRB departmental review committee and has been approved. The DRC further recommends that this application be reviewed as:

[X] Expedited Review -- Category(s): _____

OR

[ ] Full IRB Review

Chair, DRC: __Dr. Dixie Thompson, Ph.D._____

Signature: _____ Date: _____

Department Head: __Dixie Thompson, Ph.D._____

Signature: _____ Date: _____

Protocol sent to Research Compliance Services for final approval on (Date) : _____

Approved:
Research Compliance Services
Office of Research
1534 White Avenue

Signature: _____ Date: _____

For additional information on Form B, contact the Office of Research Compliance Officer or by phone at (865) 974-3466.

Appendix E

Table 1

Contract Objectives

	Met	Did Not Meet
1) Execute an energy savings performance contract that was performance based	X	
2) Conduct an energy audit of all city facilities*	X	
3) Implement energy reducing capital	X	
4) To reduce environmental impacts inclusive of both direct and indirect greenhouse gas emissions.	X	

Note. * = parks and recreation departments only

Table 2

Knoxville Parks and Recreation Utility Costs

Facility Type	*n*	FY 2009	FY 2010	FY 2011*	*%Δ 2009-2010*	*%Δ 2009-2011*	Net Δ
A uatics	3	90,561	72,611	100,184	-20%	11%	-9%
M nned Recreation Centers	15	341,289	307,703	288,018	-10%	-16%	-25%
Unmanned Recreation Centers	8	71,605	65,507	64,823	-9%	-9%	-18%
Athlet cs	28	337,807	367,469	338,086	9%	0%	9%
Parks	42	102,679	88,405	104,902	-14%	2%	-12%
Cumulative Facilities	96	943,940	901,695	896,013	-4%	-5%	-10%

Note. FY = fiscal year. Each utility bill is represented in United States Currency.

*Fiscal year 2011 consisted of annualized data that was developed from a six month period.

Table 3

Facility Utility Bills

Facility Type	*n*	Range	Min.	Max.	*M*	SD
Aquatics	3	17243.16	-6544.08	10699.08	7108.78	3072.959
Manned Recreation Centers	15	28872.42	14826.72	43699.14	26433.35	8949.158
Unmanned Recreation Centers	8	5487.16	3373.09	8860.25	5650.79	1491.954
Athletics	28	19268.07	17693.87	36961.94	29143.98	3870.945
Parks	42	13448.01	4842.48	18290.49	8117.83	2643.257

Note. This table represents utility bills over the course of thirty months for each facility type.

VITA

Anthony Brown grew up in Illinois and traveled to Georgia where he received his B.S. degree in Business Administration from Georgia Southern University. He decided to stay in Georgia and gain experience in management. He was relocated to New Jersey, and assisted in the birth of a high profile beachfront fitness gym. He worked as a physical trainer and was able to gain work experience in the recreation industry. Mr. Brown also worked professionally and successfully in the insurance industry during his stint in New Jersey, where he was also able to acquire time management skills while balancing two careers. He spent time a large amount of time interacting with local triathlon community, cycling clubs and assisting in road race development in the local community.

Anthony then moved back to Knoxville, Tennessee where he received his Master's in Recreation and Sport Management from the University of Tennessee (UT) in 2011. During this time he has written a publication for the *Sport Management Encyclopedia*, regarding marathon race management and marketing. He has also collaborated on a research project to be presented in Madrid, Spain at the European Association of Sports Managers in September 2011. The project is entitled *Corporate Social Responsibility in European Sports Clubs: Analysis and Classification of Activities/Programs*. This research evaluates the European Football League and each of the teams roles played in corporate social responsibility. Mr. Brown was also able to collaborate with the University of Tennessee Outdoor Program and develop an adventure course for the UT Leaders program that helped the individuals display knowledge of navigation, Wilderness First Responder, leadership skills, teamwork, belaying, and kayaking.

Anthony was also able to volunteer for sport management opportunities throughout his graduate program. These opportunities consisted of 4Kay 5K, SEC Track and Field Championship, Rev3 Triathlon, Tour De Cure, Adaptive Golf Clinic, Knoxville Biker Rally, A3 Celebrity Golf Tournament, and the Legacy Parks Foundation Luncheon. Each race event consisted of checking in athletes, operating as a service representative, monitoring the race course, and operating aid stations. During his volunteer time with the SEC Track and Field Championship he had to opportunity to help manage the food and beverage of all coaches and athletes. He was also in charge of scoring field events and interacting with athletes. During the Tour De Cure, Anthony helped set up and break down the event. While volunteering at the golf clinic, Anthony was trained a week in advance on how to interact with people with disabilities and help assist them in their golf swing. Anthony also made sure that each participant was fully hydrated and was given direction on how to improve their golf swing. At the Knoxville Biker Rally, Anthony worked as a customer service representative for the City of Knoxville and helped provide pamphlets to participants as well as answer any possible questions about the event or the city. Anthony was privileged to work at the A3 Golf Tournament which played host to many celebrities. He was able to monitor greens, assist in food and beverage supply including cooking, and he was able to set up the event for successful operation. The last event was the Legacy Parks Foundation Luncheon where Anthony was given the opportunity to set up table and chairs for foundation supporters, where Sir Edmund Hillary, Jr. was the guest speaker.

During his graduate school education, Anthony worked as a Graduate Teaching Assistant within the Physical Education Activity Program. He was able to lecture and instruct college

students in fitness swimming, walking, and strength and conditioning classes. Anthony Brown is also a veteran triathlete, marathoner, and runner. He has competed in over 50 events in his lifetime and has been able to experience, from both a volunteer and competitive standpoint, very large and successfully run events. He has also been able to experience very poorly run events and has gained insight into issues that may arise at sport venues.